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Military and naval defences. Ho. Reps., Ex. Doc. no. 243, 24th Cong., 1st session. Message from the President of the United States to the Senate of the United States, accompanied with reports from the Secretaries of War and Navy, relative to the military and naval defences of the country.

37TH CONGRESS, 2d Session. } HOUSE OF REPRESENTATIVES. { Ex. Doc. No. 92.

MILITARY AND NAVAL DEFENCES.

HOUSE OF REPRESENTATIVES, U. S., *March* 26, 1862.

Resolved, That fifteen hundred and fifty copies of Executive Document No. 243, 1st session 24th Congress, Executive Document No. 206, 1st session 26th Congress, and Executive Document No. 5, 1st session 32d Congress, on fortifications, floating batteries, and other means of defence, be printed for the use of the House.

HO. REPS., EX. DOC. No. 243, 24th CONGRESS, 1st SESSION.

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES

TO THE

Senate of the United States, accompanied with reports from the Secretaries of War and Navy, relative to the military and naval defences of the country.

APRIL 8, 1836.—Read, and ordered that it be printed; and that so much as relates to the military defences be referred to the Committee on Military Affairs, and so much as relates to the naval defences to the Committee on Naval Affairs.

To the Senate:

I transmit herewith reports from the Secretaries of the War and Navy Departments, to whom were referred the resolutions adopted by the Senate on the 18th of February last, requesting information of the probable amount of appropriations that would be necessary to place the land and naval defences of the country upon a proper footing of strength and respectability.

In respect to that branch of the subject which falls more particularly under the notice of the Secretary of War, and in the consideration of which he has arrived at conclusions different from those contained in the report from the Engineer bureau, I think it proper to add my concurrence in the views expressed by the Secretary.

ANDREW JACKSON.

WASHINGTON, *April* 8, 1836.

DEPARTMENT OF WAR, *April* 7, 1836.

SIR: In conformity with your instructions, I have the honor to transmit reports from the engineer and ordnance departments, furnishing so much of the information required by the resolution of the Senate of February 18, 1836, as relates to the fortifications of the country, and to a supply of the munitions of war. The former branch of this subject has required laborious investigations on the part of the officers charged with this duty, and their report has therefore been longer delayed than, under other circumstances, would have been proper; but the whole matter was too important to have the interests involved in it sacrificed to undue precipitancy.

The engineer report was received at the department on Friday last, and I have embraced such portions of the intervening time as other official calls and a slight indisposition would allow me to devote to its examination. I did not consider that any suggestions I could make would justify a further delay at this advanced stage of the session, while, at the same time, I am aware that this letter will need all the allowance which these circumstances can claim for it.

It is obvious that, in the consideration of any general and permanent system of national defence, comprehensive views are not only necessary, but professional experience and a knowledge of practical details; such information, in fact, as must be obtained by long and careful attention to the various subjects which form the elements of this inquiry. Although, therefore, I do not concur in all the suggestions contained in these reports, and more particularly in those which relate to the nature and extent of some of our preparations, still I have thought it proper to lay them before you, rather than to substitute any peculiar views of my own for them. Both furnish facts highly interesting to the community, and if they anticipate dangers which it may be thought are not likely to happen, and suggest preparations which future exigencies will not probably require, they are still valuable documents, presenting the necessary materials for the action of the legislature. The report from the engineer department, in particular, evinces an accurate knowledge of the whole subject, while, at the same time, its general views are sound and comprehensive. I consider it a very able document.

Under these circumstances, I have thought it proper to submit some general remarks, explanatory of my own views, concerning a practical system of defence, and which will show how far the plans and details are in conformity with my opinion. I feel that this course is due to myself.

I shall confine my observations to the maritime frontier. Our inland border rests, in the southwest and northeast, upon the possessions of civilized nations, and requires defensive preparations to meet those contingencies only which, in the present state of society, we may reasonably anticipate. In the existing intercourse of nations, hostilities can scarcely overtake us so suddenly as not to leave time to move the necessary force to any point upon these frontiers threatened with attack. I am not aware of any peculiar position upon either of these lines of separation which commands the approaches to the country, or whose possession would give much superiority to an invading or defensive force. In fact, the division is, in both cases, an artificial line through much of its extent, and a portion of the natural boundary offers scarcely any impediment to military operations. Under such circumstances, it seems altogether inexpedient to construct expensive fortifications, which would do little more than protect the space under cover of their guns; which are not required as places of *depot;* which guard no avenue of communication, and which would leave the surrounding country penetrable in all directions. Without indulging in any improper speculations concerning the ultimate destiny of any portion of the country in juxtaposition with us, or looking for security to any political change, we may safely anticipate that our own advance in all the elements of power will be at least equal

to that of the people who adjoin us; nor does the most prudent forecast dictate any precautions, founded upon the opinion that our relative strength will decrease and theirs increase. The lake frontier, indeed, presents some peculiar consideration; and I think the views submitted by the engineer department, respecting Lake Champlain, are entitled to much weight. This long, narrow sheet of navigable water opens a direct communication into the States of New York and Vermont, while its outlet is in a foreign country, and is commanded by a position of great natural strength. It is also within a few miles of the most powerful and populous portion of Canada, and open to all its resources and energies. With a view, perhaps, to possible rather than to probable events, it may be deemed expedient to construct a work at some proper site within our boundary, which shall close the entrance of the lake to all vessels ascending its outlet. As such a work, however, would be an advanced post, and, from circumstances, peculiarly liable to attack, its extent and defences should be in proportion to its exposure.

There is already a considerable commercial marine upon the four great lakes, Ontario, Erie, Huron, and Michigan, which are open to the enterprise of our citizens. And this will increase with the augmenting population which is flowing in upon the regions washed by these internal seas. It is obvious that, from natural causes, the physical superiority will be found upon the southern shores of these lakes. The resolution of the Senate embraces the inquiry into the expediency of constructing permanent fortifications in this quarter. And this inquiry properly divides itself into two branches:

1st. The policy of fortifying the harbors on the lakes; and,

2d. The policy of commanding, by permanent works, the communications between them.

Both of these measures presuppose that the naval superiority upon these waters may be doubtful. But it is difficult to foresee the probable existence of any circumstances which would give this ascendency to the other party. It is unnecessary to investigate the considerations which bear upon this subject, as they are too obvious to require examination. They are to be seen and felt in all those wonderful evidences of increase and improvement which are now in such active operation. A victorious fleet upon these lakes could disembark an army at almost any point. If a harbor were closed by fortifications they would only have to seek the nearest beach, and land their men from boats, so that no defences we could construct would secure us against invasion; and temporary block-houses and batteries would probably be found sufficiently powerful to repel the attacks of any vessels seeking to enter the narrow harbors upon the lakes, if we could foresee the existence of any circumstances which would induce an enemy to endeavor to force an entrance into them.

As to the communication between the lakes, the inquiry, from geographical causes, is necessarily restricted to that from Lake Erie to Lake Huron, and to the straits of Michilimackinac. Of the former, almost sixty miles consist of two rivers, completely commanded from their opposite banks, while the entrance into one of these, the river St. Clair, is impeded by a bar, over which there are but about eight feet of water. No armed vessels could force their way up these rivers while the shores were in an enemy's possession, who might construct batteries at every projecting point, and who, in fact, might in many places sweep the decks with musketry. As to the straits of Michilimackinac, they are too broad to be commanded by stationary fortifications, even if any circumstances should lead to the construction and equipment of a hostile fleet upon the bleak and remote shores of Matchedask bay, in the northeastern extremity of Lake Huron.

I am therefore of opinion that our lake frontier requires no permanent defences, and that we may safely rely for its security upon those resources, both in the *personnel* and *materiel*, which the extent and other advantages our country insure to us, and which must give us the superiority in that quarter.

It may, perhaps, be deemed expedient to establish a *depot* for the reception of munitions of war in some part of the peninsula of Michigan, and to strengthen it by such defences as will enable it to resist any *coup de main* which may be attempted. From the geographical features of the country, our possessions here recede from their natural points of support, and are placed in immediate contact with a fertile and populous part of the neighboring colony. In the event of disturbances the ordinary communications might be interrupted, and it would probably be advisable to have in deposit a supply of all the necessary means for offensive or defensive operations, and to place these beyond the reach of any enterprising officer who might be disposed, by a sudden movement, to gain possession of them. The expenditure for such an object would be comparatively unimportant, even should the contingency be judged sufficiently probable to justify precautionary measures.

I had the honor, in a communication to the chairman of the Committee on Military Affairs of the Senate, dated February 19, 1836, a copy of which was sent to the chairman of the Committee on Military Affairs of the House of Representatives, to suggest the mode best adapted, in my opinion, to secure our frontier against the depredations of the Indians. The basis of the plan was the establishment of a road from some point upon the upper Mississippi to Red river, passing west of Missouri and Arkansas, and the construction of posts in proper situations along it. I think the ordinary mode of construction ought not to be departed from. Stockaded forts, with log block-houses, have been found fully sufficient for all the purposes of defence against Indians. They may be built speedily, with little expense, and, when necessary, by the labor of the troops. Our Indian boundary has heretofore been a receding, not a stationary one, and much of it is yet of this character. And even where we have planted the Indians who have been removed, and guaranteed their permanent occupation of the possessions assigned to them, we may find it necessary, in the redemption of the pledge we have given to protect them, to establish posts upon their exterior boundary, and thus prevent collisions between them and the ruder indigenous tribes of that region. I think, therefore, that no works of a more permanent character than these should be constructed upon our Indian frontier. A cordon established at proper distances upon such a road, with the requisite means of operation deposited in the posts, and with competent garrisons to occupy them, would probably afford greater security to the advanced settlements than any other measures in our power. The dragoons should be kept in motion along it during the open season of the year, when Indian disturbances are most to be apprehended, and their presence and facility of movement would tend powerfully to restrain the predatory disposition of the Indians; and if any sudden impulse should operate or drive them into hostilities, the means of assembling a strong force, with all necessary supplies, would be at hand, and, as circumstances permit, the posts in the Indian country now in the rear of this proposed line of operations should be abandoned and the garrisons transferred to it.

But it is upon our maritime frontier that we are most exposed. Our coast for three thousand miles is washed by the ocean, which separates us from those nations who have made the highest advances in all the arts, and particularly in those which minister to the operations of war, and with whom, from our intercourse and political relations, we are most liable to be drawn into collision. If this great medium of communication, the element at the same time of separation and of union, interposes peculiar obstacles to the progress of hostile demonstrations, it also offers advantages which are not less obvious, and which, to be successfully resisted, require corresponding arrangements and exertions. These advantages depend on the economy and facility of transportation, on the celerity of movement, and on the power of an enemy to threaten the whole shore spread out before him, and to select his point of attack at pleasure. A powerful hostile fleet upon the coast of the United States presents some of the features

of a war, where a heavy mass is brought to act against detachments which may be cut up in detail, although their combined force would exceed the assailing foe. Our points of exposure are so numerous and distant that it would be impracticable to keep, at each of them, a force competent to resist the attack of an enemy, prepared by his naval ascendency, and his other arrangements, to make a sudden and vigorous inroad upon our shores. It becomes us, therefore, to inquire how the consequences of this state of things are to be best met and averted.

The first and most obvious, and in every point of view the most proper, method of defence is an augmentation of our naval means to an extent proportioned to the resources and the necessities of the nation. I do not mean the actual construction and equipment of vessels only. The number of those in service must depend on the state of the country at a given period: but I mean the collection of all such materials as may be preserved without injury, and a due encouragement of those branches of interest essential to the growth of a navy, and which may be properly nurtured by the government; so that, on the approach of danger, a fleet may put to sea, without delay, sufficiently powerful to meet any force which will probably be sent to our coast.

Our great battle upon the ocean is yet to be fought, and we shall gain nothing by shutting our eyes to the nature of the struggle, or to the exertions we shall find it necessary to make. All our institutions are essentially pacific, and every citizen feels that his share of the common interest is affected by the derangement of business, by the enormous expense, and by the uncertain result, of a war. This feeling presses upon the community and the government, and is a sure guarantee that we shall never be precipitated into a contest, nor embark in one, unless imperiously required by those considerations which leave no alternative between resistance and dishonor. Accordingly, all our history shows that we are more disposed to bear, while evils ought to be borne, than to seek redress by appeals to arms; still, however, a contest must come, and it behooves us, while we have the means and the opportunity, to look forward to its attendant circumstances, and to prepare for the consequences.

It is no part of my object to enter into the details of a naval establishment. That duty will be much more appropriately and ably performed by the proper department; but as some of the views I shall present on the subject of our system of fortifications must be materially affected by any general plan of naval operations which, in the event of hostilities, might be adopted, I am necessarily led to submit a few remarks, not professional, but general, upon the extent and employment of our military marine.

There is as little need of inquiry now into our moral as into our physical capacity to maintain a navy, and to meet upon equal terms the ships and seamen of any other nation. Our extended commerce, creating and created by those resources which are essential to the building and equipment of fleets, removes all doubt upon the one point, and the history of our naval enterprise, from the moment when the colors were first hoisted upon the hastily-prepared vessels at the commencement of our revolutionary struggle to the last contest in which any of our ships have been engaged, is equally satisfactory upon the other. The achievements of our navy have stamped its character with the country and the world. The simple recital of its exploits is the highest eulogium which can be pronounced upon it.

With ample means, therefore, to meet upon the ocean, by which they must approach us, any armaments that may be destined for our shores, we are called upon by every prudential consideration to do so. In the first place, though all wars in which we may be engaged will probably be defensive in their character, undertaken to repel or resent some injury, or to assert some right, and rendered necessary by the conduct of other nations, still the objects of the war can be best attained by its rigorous prosecution. Defensive in its causes, it should be

offensive in its character. The greater injury we can inflict upon our opponent, the sooner and the more satisfactory will be the redress we seek. Our principal belligerent measures should have for their aim, to attack our antagonist where he is most vulnerable. If we are to receive his assaults, we abandon the vantage ground, and endeavor, in effect, to compel him to do us justice by inviting his descent upon our shores, and by all those consequences which mark the progress of an invading force, whether for depredation or for conquest. By the ocean only can we be seriously assailed, and by the ocean only can we seriously assail any power with which we are likely to be brought into collision.

But, independently of the policy of making an adversary feel the calamities of war, it is obvious that, even in a defensive point of view alone, the ocean should be our great field of operations. No one would advocate the project of endeavoring to make our coast impervious to attack. Such a scheme would be utterly impracticable. A superior fleet, conveying the necessary troops, could effect a landing at numerous points upon our shores, even if the best devised plan of fortifying them were consummated; and, from the nature of maritime operations, such a fleet could bring its whole strength to bear upon any particular position, and by threatening or assailing various portions of the coast, either anticipate the tardy movements of troops upon land, and effect the object before their concentration, or render it necessary to keep in service a force far superior to that of the enemy, but so divided as to be inferior to it upon any given point. These dangers and difficulties would be averted or avoided by the maintenance of a fleet competent to meet any hostile squadrons which might be detached to our seas. Our coast would thus be defended on the ocean, and the calamities of war would be as little felt as the circumstances of such a conflict would permit.

As to the other advantages of a navy, in the protection of commerce, they do not come within the scope of my inquiries, and are not therefore adverted to; nor is it necessary, or indeed proper, that I should present those considerations of distance, of exposure, and of station, which would render a fleet numerically inferior in the aggregate to that of the enemy, yet still sufficiently powerful, upon our own coasts, to meet and overcome any armament which could probably be sent here.

It seems to me, therefore, that our first and best fortification is the navy. Nor do I see any limit to our naval preparations, except that imposed by a due regard to the public revenues from time to time, and by the probable condition of other maritime nations. Much of the *materiel* employed in the construction and equipment of vessels is almost indestructible, or at any rate may be preserved for a long series of years; and if ships can be thus kept without injury upon the stocks, by being built under cover, I do not see what should restrain us from proceeding to build as many as may be deemed necessary, and as fast as a due regard to their economical and substantial construction will permit, and to collect and prepare for immediate use all the munitions of war, and other articles of equipment not liable to injury or decay by the lapse of time. Nor do I see that these preparations should be strictly graduated by the number of seamen who would probably enter the service at this time, or within any short period. To build and equip vessels properly requires much time, as well with reference to the execution of the work as to the proper condition of the materials employed. And the costly experiment made by England, when she too hastily increased her fleet, about thirty years ago, by building ships with improper materials and bad workmanship, ought to furnish us with a profitable lesson. These vessels soon decayed, after rendering very little service. Naval means should therefore be provided at a period of leisure, to be ready for immediate employment in a period of exigency; and a due regard to prudence dictates that these means should so far exceed the estimated demands of the service as to supply in the shortest time any loss occasioned by the hazards of

the ocean and the accidents of war. We may safely calculate that the number of seamen in the United States will increase in proportion to that rapid augmentation which is going on in all the other branches of national interest. If we assume that at a given period we may expect to embark in war, our capacity to man a fleet will exceed our present means by a ratio not difficult to ascertain. And even then, by greater exertions and perhaps higher wages, a larger portion may be induced to enter the naval service, while no exertions can make a corresponding addition to the navy itself, but at a loss of time and expense, and a sacrifice of its permanent interest.

But whatever arrangements we may make to overcome any naval armaments sent out to assail us, we are liable to be defeated and to be exposed to all the consequences resulting from the ascendency of an enemy. And the practical question is, what shall be done with a view to such a state of things? As I have already remarked, any attempt by fortifications to shut up our coast, so that an enterprising foe, with a victorious fleet, conveying a competent force, and disposed to encounter all the risk of such an expedition, could not make his descent upon the shore, would be useless in itself, and would expose to just censure those who should project such a scheme. And, on the other hand, the government would, if possible, be still more censurable were our important maritime places left without any defensive works. Between these extremes is a practical medium, and to ascertain where it lies we must briefly look at the various considerations affecting the subject.

What have we to apprehend in the event of a war? Is it within the limits of a reasonable calculation that any enemy will be able and disposed to debark upon our coast an army sufficiently powerful to lay siege to our fortifications and to endeavor, by this slow and uncertain process, to obtain possession of them? I put out of view the enormous expense attending such a plan; the distance of the scene of operations from the points of supply and support, with the consequent difficulties and dangers, and the possibility that the convoying fleet might be overpowered by a superior force, and the whole expedition captured or destroyed. All these are considerations which no prudent statesman, directing such an enterprise, will overlook. But beyond these is a question bearing still more directly upon the point under examination. Is there any object to be attained sufficiently important to justify the risk of placing a body of land troops before one of these works, too strong to be carried by a *coup de main*, and endeavoring to destroy the defence by a regular investment? I think there can be none.

I take it for granted that no nation would embark in the quixotic enterprise of conquering this country. Any army, therefore, thrown upon our coast would push forward with some definite object to be attained by a prompt movement and by vigorous exertions. Our experience, more than half a century ago, demonstrated that an invading force could command little more than the position it actually occupied. The system of fortifications adopted in Europe is not applicable to our condition. There military movements must be made upon great avenues of communication, natural or artificial, and these are closed or defended by fortresses constructed with all the skill that science and experience can supply, and with all the means that wealth and power can command. An invading army must carry these positions by escalade or by siege, or leave sufficient detachments to blockade them, or must turn them and move on with all the difficulties attending the interruption of their communication, and with the dangers which such a force in their rear must necessarily occasion. Works of this character are keys to many of the European states, whose political safety depends upon their preservation. Their possession enables their governments to meet the first shock of war, and to prepare their arrangements, political or military, to resist or avert the coming storm. And although, during some of the wars which arose out of the French revolution, when, from causes which history

is now developing, the armies of France set at defiance the received maxims of military experience, and justifying their apparent rashness by success, reduced, with unexampled facility, or carried on their operations almost in contempt of the strongest fortifications, the subjugation of each of which had been till then the work of a campaign, still the opinion is yet entertained by many that this system of defence is best adapted to the condition of the European community.

There is also a striking difference between the political situation of those countries and that of ours, which gives to these defensive preparations a character of importance which can never apply to the United States. The possession of a capital in the eastern hemisphere is too often the possession of the kingdom. Habits of feeling and opinion, political associations, and other causes, combine to give to the metropolis an undue ascendency. Internal parties, contending for superiority, and external enemies, aiming at conquest, equally seek to gain possession of the seat of government. And the most careless observer of the events of the last half century must be struck with the fact that the fate of the capitals and the kingdoms of modern Europe are closely connected together. Under such circumstances, it may be prudent, by powerful fortresses, to bar the approaches to these favored places, and frequently to construct works to defend them from external attack, or to maintain their occupation against internal violence.

But there is nothing like this in our country, nor can there be till there is a total change in our institutions. Our seats of government are merely the places where the business of the proper departments is conducted, and have not themselves the slightest influence upon any course of measures, except what is due to public opinion and to their just share of it. If the machine itself were itinerant, the result would be precisely the same. Or, if by any of the accidents of war or pestilence, the proper authorities were compelled to change their place of convocation, the change would be wholly unobserved, except by the few whose personal convenience would be affected by the measure. Nor have our commercial capitals any more preponderating influence than our political ones. And although their capture by an enemy, and the probable loss of property, and derangement of business, which would be the result, might seriously affect the community, yet it would not produce the slightest effect upon the social or political systems of the country. The power belongs to all, and is exercised by all.

It follows, therefore, that an enemy could have no inducement to hazard an expedition against any of our cities, under the expectation that their capture and possession would lead to political results favorable to them. Washington may indeed be taken again, and its fall would produce the same emotion which was everywhere felt when its former capture was known. But an enemy would retire from it with as few advantages as marked its first abandonment, and if his course were the same, with as few laurels as he won by its possession. I make these remarks, because it seems to me that some of the principles of the European system of fortifications may possibly be transferred to this country, without sufficient attention having been given to those circumstances, both geographical and political, which require a plan exclusively adapted to our own condition.

I consider some of the existing and projected works larger than are now necessary, and calculated for exigencies we ought not, with the prospects before us, to anticipate. If such is the fact, the objection is not only to the expense of their construction and preservation, but also to the greater difficulty of defending them, and the increased garrisons which must be provided and maintained. The hypothesis upon which their extent has been determined is, that they may be exposed to investment, both seaward and landward, and that they ought to be capable of resisting a combined attack, or, in other words, that their

water batteries should be sufficient to repel an assailing squadron, and that their land defences should be sufficient to resist a besieging army.

It is certain that whatever works we erect should be so constructed as to be beyond the reach of any *coup de main* that would probably be attempted against them; and this capacity must depend upon their exposure and upon the facility with which they can be relieved But this proposition is far different from one to construct them upon a scale of magnitude which presupposes they are to be formally invested by a powerful land force, and which provides for their ability to make a successful resistance. A dashing military or naval officer may be willing to risk something to get possession of an insulated post by a prompt movement, expecting to accomplish his enterprise before his adversary can be prepared, or succor obtained; and this, even when he looks to no other advantage than the capture of the garrison, and the effect which a brilliant exploit is calculated to produce; and when he is aware that he must abandon his conquest with as much celerity as he attained it. But formal investments of fortified places, with all their difficulties, and expense, and uncertainty, are only undertaken when there is some object of corresponding importance to be expected. We have works constructed which it would require armies to reduce. Have we any reason to anticipate that they will be assailed by a force proportioned to their magnitude?

I have already remarked that a European power cannot expect to retain permanent possession of any part of this country. If, therefore, he succeed in overcoming or eluding our fleets, and is prepared with a respectable land force, and ready to risk its employment upon our territory, he can land at many points which we cannot close against him. His debarkation is not a question of practicability, but of expediency. If a safe harbor or roadstead offers itself, and there is no defensive work to prevent his approach, he will, of course, land at the nearest point to the object of his marauding enterprise. If there is such a work, it will be a question of calculation whether it is better to attack and carry it, or to seek another, though more distant, point of debarkation. I think there can be little doubt but there are few, if any, positions in our country which an enemy would not under such circumstances avoid. He would be aware of the facility of communication which our rivers, canals, and railroads afford, of the powerful use we should be prepared to make of steam in its various forms of application, and of the immense force which in a short time could be concentrated upon a given point; and it is scarcely within the limits of possibility that he would venture formally to besiege one of our forts, or if he did, that he would not repent his rashness. Neither the co-operation of his fleet, nor the nearer proximity of the place of landing to the object of attack, would induce him to seek these advantages at the cost which must attend the slow process of besieging a fort, when, by removing to another position, he would land in safety, and save in time, in promptness of movement, and in his escape from the perils of a doubtful contest, more than he would lose by the difference in distance.

I am aware it may be objected that the weakness of a work might tempt an enemy to attack it, and that it may be supposed the power of some of our fortifications to resist a siege may hereafter furnish the true reason why they may not be compelled to encounter one. Certainly the stronger a work is, the less will it be exposed to danger. But this would not furnish a sufficient reason for making its defences out of reasonable proportion to its exposure. The true inquiry is, What circumstances will probably induce and enable an enemy to assail a given point, and with what force; and how can we best meet and repel him? And I believe a just consideration of this proposition will lead to the conclusion that there are scarcely any positions in our country where an enemy would venture to set down before a work too strong to resist a *coup de main*. In the view, therefore, which I take of this whole subject, it will be perceived that I do not merely suppose an enemy will not invest our larger works, but

that they would not do so were these works much inferior to what they are, both in their dimensions and construction.

What object would justify an enemy in attempting to land an army upon our coast? He would not expect to lay waste the country, for such a mode of warfare is not to be anticipated in the present state of society. All that, under the most favorable circumstances, he could accomplish, would be to gain sudden possession of a town and levy contributions, or to destroy a naval establishment, commercial or military, and precipitately retire to his ships before his operations could be prevented, or his retreat intercepted I cannot, therefore, concur in the suggestion made in the engineer report, that the first of the three great objects to be attained by the fortifications of the first class should be to "prevent an enemy from forming a permanent or even a momentary establishment in the country." It is not suited to the present and prospective situation of the United States. I understand the establishments herein contemplated are not the temporary occupation of naval arsenals and cities for the purpose of destruction or plunder, because these objects are specially enumerated, but are lodgments where armies may be stationed, and whence they may issue to commit inroads into the country.

I refer, in these remarks, to our maritime coast generally. There are, no doubt, certain points less equal to self-defence than others, and where the preparation must be greater. Of this class is the delta of the Mississippi, not only in consequence of its many avenues of approach, but because its great natural highway does not at present allow those lateral supplies of the *personnel*, which, from geographical formation, and from the state of the settlements, can be speedily thrown upon most other points of the country. This region, however, is admirably adapted to the use of steam batteries, and they will form its principal means of defence.

To apply these remarks to the plan of fortifications partly completed and partly projected. Fort Monroe, at Old Point Comfort, covers about sixty-three acres of ground, and requires, by the estimates of the engineer department, two thousand seven hundred men to garrison it in time of war. Its full armament consists of 412 pieces of different descriptions and calibre. I have been desirous of comparing its superficial extent with some of the European fortresses; but the necessary information could not be obtained within the short time that could be allowed for the inquiry. I understand from General Gratiot, however, that it is probably larger than almost any of the single works in Europe which do not enclose towns within their circuit. Drinkwater, in his history of the siege of Gibraltar, states that 572 guns were mounted upon that fortress.

The object to be attained by Fort Monroe, in conjunction with Fort Calhoun, intended to mount 232 guns, is to prevent an enemy from entering Hampton roads, a safe and convenient roadstead. This object is important, because this bay is perfectly landlocked, and has sufficient depth of water for the largest vessels, and is, withal, so near the capes of the Chesapeake that it furnishes the best station which an enemy could occupy for annoying our commerce, and for committing depredations upon the shores of that extensive estuary. But these works do not command the entrance into the Chesapeake; nor is Hampton roads the only safe anchorage for a hostile fleet. Their possession, therefore, does not exclude an enemy from these waters though they will compel him to resort to less convenient positions from whence to carry on his enterprises. A hostile squadron reaching the Chesapeake, and finding the entrance into Hampton roads guarded by sufficient works, though much less extensive than those at Fort Monroe, would necessarily consider whether the possession of that roadstead is so important as to justify the debarkation of a large body of land troops, and to attempt to carry the works by regular approaches, and this in the face of the strenuous efforts which would be made to relieve it by all the aids afforded by the most improved facilities of communication, and by the light

and heavy steam-batteries which, upon the approach of war, would be launched upon the Chesapeake, and which, during periods of calm, or in certain winds, could approach the hostile ships and drive them from their anchorage, or compel them to surrender, and most of which, from their draught of water, could take refuge in the inlets that other armed vessels could not enter. And even if the works were carried, they could not be maintained without the most enormous expense, nor in fact without efforts which no government three thousand miles off could well make, and all this, while Lynnhaven bay, York bay, the Rappahannock, Tangier island, the mouth of the Potomac, and many other places, furnish secure anchorage, and are positions from which an enemy, having the superiority, could not be excluded, and while, in fact, a great part of the Chesapeake may be considered as affording good anchorage ground for large ships. Neither of them is equal to Hampton roads, but most or all of them furnish stations for occupation and observation which would render it unnecessary to purchase the superior advantages of Hampton roads by the sacrifice and hazard which would attend the effort. The occlusion of this roadstead does not secure Norfolk, important as it is from its commerce and navy yard. It only prevents the access of ships-of-war to it. And against these there is an interior line of defence, which may be considered as accessory to, and, if necessary, independent of, the other. And a land force, deeming the destruction of the navy yard at Norfolk a sufficient object to justify such an expedition, would not sit down before Fort Monroe, if its scale of defence were far inferior to what it now is, but would debark at Lynnhaven bay, where there is no impediment, and march in five or six hours through an open country to Norfolk.

New York is, in every point of view, our most important harbor, and its defences should provide for every reasonable contingency. The engineer report recommends three classes of works: an interior one for the protection of the harbor; an exterior one to shut up Raritan bay; and a third to prevent a hostile fleet from approaching the city through the sound nearer than the vicinity of Throg's Point. The importance of the first class cannot be doubted. That of the second depends on the value of Raritan bay to an enemy as an anchorage ground, and on the utility of excluding him from a landing at Gravesend bay, upon Long Island, whence an army could march, without obstruction, to Brooklyn and New York. The third is proposed to be erected in order to bar his access to the lower part of the sound, or, more accurately speaking, to prevent his reaching Hell Gate, a natural barrier which no fleet could pass, and which is within ten miles of the city. Here, if his aim were New York, he would land, and would find no works to prevent his approach. The two forts proposed to be erected at Throg's Neck and Wilkin's Point, eight miles further up the sound, would compel him to debark beyond the reach of their guns, and would thus add that distance to his march, while on the north shore Harlæm river would be interposed between him and the city. On the Long Island side there would be no difference but that occasioned by the distance.

It is obvious then that, in the consideration of this plan involving an estimated expenditure in the aggregate of $5,807,969, and efficient garrisons in time of war of nine thousand men, a close investigation should be made into all the circumstances likely to influence the operations of an enemy. Is the anchorage ground between the Narrows and Sandy Hook of sufficient value to an enemy, looking to the risk of his occupation of the coast and to the doubts that may be reasonably entertained of the result of so great an experiment to be carried on, in fact, in the sea, to authorize the commencement of these works without a new examination? Or is the probability of the disembarkation of an army at Gravesend bay in preference to some other point upon the coast of Long Island, if a convenient one exists, so great as to require these preparations? The same questions may be asked respecting Wilkin's Point. The work at Throg's Point is in the process of construction, and as the river is only about

three-fourths of a mile wide at this place I think its completion would be sufficient for this line of defence till the proposed general examination can take place.

The situation of New York affords a fine theatre for the operation of floating batteries, and whether a sufficient number of them would secure it from the designs of an enemy better than the full completion of the extensive system of permanent fortifications recommended is a question deserving investigation. Such an investigation I recommend, and after all the necessary facts and considerations are presented the government should proceed to place this commercial metropolis of the country in a state of security.

The works at Newport cover about twenty acres and will mount 468 guns, and will need for their defence about two thousand four hundred men. I cannot myself foresee the existence of any circumstances which now call for a fortress of this magnitude in the very heart of New England; constructed not merely to command the harbor of Newport, but to resist a siege which would probably require nearly twenty thousand men to carry it on. I am at a loss to conjecture what adequate motive could induce a foreign government to detach a fleet and army upon this enterprise. The expense would be enormous. The French army that invaded Egypt was less than forty thousand men, and required for its protection and transportation between five and six hundred vessels. The army that conquered Algiers was about equal in force, and required, it is said, about four hundred transports besides the ships-of-war. This scale of preparation for enterprises against the shores of the Mediterranean may enable us to form some conception of the arrangements that would be necessary to send across the ocean to this country, in the present day of its power, an expedition strong enough to form an establishment upon our shores, and to furnish it with supplies necessary to its subsistence and operations.

It has been supposed, indeed, by the board of engineers, that an enemy would find sufficient reason for the occupation of Rhode Island in the consideration that it would afford a secure lodgement, whence expeditions could be sent to every part of our coast. But it is to be observed that no part of Narraganset bay is necessary for the safety of a hostile fleet watching that part of our coast. Gardiner's bay in that vicinity is a most safe and convenient station, which was occupied by the British during almost the whole of the late war, and it is pretty clear that it cannot be defended by any stationary fortifications that can be constructed. If it can by floating batteries, so may Narraganset bay, and the enemy thus prevented from occupying the latter also without these extensive arrangements requiring, after Fort Adams shall have been completed at an expense of one million three hundred and twelve thousand dollars, four other forts and a sea-wall to be constructed, and eleven hundred and fifty-seven thousand dollars to be expended.

I do not think that the most prudent forecast ought to lead to the apprehension that a force competent to seize such a position would be sent to our country, or that any circumstances could enable them to maintain it in the face of the vigorous efforts that would be made to recover it, and in the midst of a country abounding in all the means to give effect to their exertions. But perhaps the most striking objection to the completion of this extensive plan is that under no possible circumstance can it effect the desired object. That object, if I understand it, is not the mere exclusion of an enemy from Rhode Island, but it is to prevent him from taking possession of a safe and convenient position, whence he could detach his forces by means of his naval superiority to any other part of the coast which would thus be exposed to his depredations.

The value of Gardiner's bay as a place of naval rendezvous I have already described. Block island, in its neighborhood, could be occupied by troops desiring only a lodgement, and so could Nantucket island and Martha's Vineyard, and these are only a few hours' sail from Narraganset bay. Buzzard's bay is

also a safe and capacious harbor which cannot be defended, and Martha's Vineyard sound affords commodious places of anchorage. A fleet riding in these moorings would have under its command all the islands in this group, and could secure its communications with its land forces encamped upon them, which would thus be enabled, at any proper time, to throw itself upon other parts of the coast. It may be doubted, if there were not a cannon mounted upon Rhode Island, whether an enemy acquainted with the topography and resources of this country would select it as his place of arms, if I may so term it, when there are islands in the neighborhood which would answer this purpose nearly as well, and where he would be in perfect safety as long as he could maintain his naval ascendency, and longer than that he could not, under any circumstances, occupy Rhode Island. And if I rightly appreciate the strength and spirit of that part of the country, his tenure, in any event, would be short and difficult. I do not mean to convey the idea that Rhode Island should not be defended. I think it should be; but I do not think that precautions should be taken against events which are not likely to happen, As there is no naval establishment here, it is not necessary to enter into any question concerning defensive arrangements exclusively connected with that object.

It will be perceived also that it is proposed to fortify Mount Desert island, on the coast of Maine, and that the expense is estimated at five hundred thousand dollars, and the number of the garrison competent to maintain it at one thousand men. This proposition is founded, not on the value of this harbor to us, for it possesses little, and is, in effect, unoccupied, but on account of its importance to the enemy. Were there no other secure position they could occupy in that quarter, and which could not be defended, I should think the views submitted upon this branch of the subject entitled to great weight. But there are many indentations upon this coast, affording safe anchorage, and which are either not capable of being defended, or from their great number would involve an enormous expense, which no sound views of the subject could justify. An enemy, therefore, cannot be deprived of the means of stationing himself upon this coast. And before this expenditure at Mount Desert island is encountered, it ought to be clearly ascertained that the difference, in its practical advantages to an enemy, between the occupation of Mount Desert island and that of some of the other roadsteads in this quarter, incapable of defence, would be sufficiently great to warrant this measure. My present impression is that it would not.

And on the subject of roadsteads generally, with a few exceptions, depending on their local positions, I am inclined to the opinion that any attempt to fortify them would be injudicious. I do not speak of harbors and inlets which are occupied by cities and towns, but of mere anchorage grounds, deriving their value from the shelter they afford. If all could be defended, and an enemy excluded from them, the advantages would justify any reasonable expenditure. But this is impracticable, and I doubt whether the circumstances, in which most of them differ, give such marked superiority to those we can defend over those we cannot, as to lead to any attempt to fortify them, in the first instance, and to maintain garrisons in them during a war.

I have adverted to these particular cases in order to present my views more distinctly than I could do by mere general observations. Certainly not from the remotest design of criticising the reports and the labors of the able professional men to whom the subject has been referred, nor of pursuing the investigation into any further detail.

I consider the duty of the government to afford adequate protection to the sea-coast a subject of paramount obligation; and I believe we are called upon by every consideration of policy to push the necessary arrangements as rapidly as the circumstances of the country and the proper execution of the work will allow. I think every town large enough to tempt the cupidity of an enemy should be defended by works, fixed or floating, suited to its local position, and

sufficiently extensive to resist such attempts as would probably be made against it. There will, of course, after laying down such a general rule, be much latitude of discretion in its application. Upon this branch of the subject I would give to the opinion of the engineer officers great and almost controlling weight, after the proper limitations are established. These relate principally to the magnitude of the works, and if I am correct in the views I have taken of this branch of the subject, a change in the system proposed is necessary. Works should not be projected upon the presumption that they are to be exposed to and must be capable of resisting the attacks of an European army, with its battering train, and all its preparations for a regular siege. Neither our relative circumstances, nor those of any nation with which we shall probably be brought into conflict, can justify us in such an anticipation. All the defences should be projected upon a scale proportioned to the importance of the place, and should be calculated to resist any naval attack, and any sudden assault that a body of land troops might make upon them. But further than this it appears to me we ought not to go. The results at Stonington, at Mobile Point, at Fort Jackson, and at Baltimore, during the late war, show that formidable armaments may be successfully resisted with apparently inferior means. These, indeed, do not furnish examples to be followed as to the scale of our preparations, but they show what stationary batteries have done in our country against ships-of-war.

It is to be observed that the great object of our fortifications is to exclude a naval force from our harbors. This end they ought fully to answer, and in this problem there are two conditions to be fulfilled:

1. That they be able to resist any naval batteries that will probably be placed against them; and

2. That they be also able to resist any *coup de main* or escalade which might be attempted by land.

An open battery, under many circumstances, might fulfil the first condition but not the second, and therefore these works should be closed and regularly constructed. It is not to be denied that the proper boundary between the magnitude and nature of the works necessary to attain the objects indicated, and those required to resist successfully a formal investment, will sometimes become a matter of doubt; nor that circumstances may not be stated which might induce an enemy to open his trenches against one of these works, because its capacity for defence was not greater. That capacity, however, with relation to the question under consideration, has a far more intimate connexion with the magnitude than with the form of the works, because, if unnecessarily large, they entail upon the country a serious evil in the increased means for their defence, independently of the additional expense in their construction. It is principally, therefore, in the latter point of view that I have presented the doubts which I have expressed upon this point.

Among the hypothetical cases heretofore stated by the board of engineers was one which supposed that an army of twenty thousand men might be assembled upon one of the flanks of our coast, and that we ought to be prepared, at every important point, to resist the first shock of such a force. I have already glanced at the reasons, geographical, political, financial, and prudential, which, in my opinion, leave little room to expect that any enemy will, hereafter, project an enterprise of this magnitude, so certain in its expense, so uncertain in its result, and so disproportioned to any object which could probably be attained. And the suggestion which was made by the board, of defending the city of Washington by works erected near the mouth of the Patuxent, proceeds upon similar views. Our navy, our floating batteries, our means of communication and concentration, seem to me far better adapted to the defence of this city than forts at the distance of nearly fifty miles, whose principal effect, if an enemy were resolved upon the enterprise, would be to compel him to make a *detour* in his expedition, or which would send him to some part of the coast of

the bay between Patuxent and Annapolis, or into the Potomac, where his descent would be uninterrupted, and where he would be but little, if any, further from Washington than at the head of navigation of the Patuxent.

Even during the last war, when the navy of Great Britain rode triumphant upon the ocean, but one serious attempt was made to force an entrance into a fortified harbor, and that was unsuccessful. The greatest possible force which can be brought, and the greatest possible resistance which can be applied, do not constitute a practical rule for the construction of our fixed defences. Moral considerations must also have weight. Probabilities must be examined. The power of the permanent batteries is one of the elements of security. So are the dangers of dispersion, and shipwreck, and all the hazards of a distant expedition, as these must operate on the councils of any country meditating such an enterprise, the efforts of our navy, the co-operation of the floating defences, and the troops which may be ready to meet the enemy upon his debarkation or march.

In submitting these reflections, I am desirous only of discharging the duty confided to me. I am gratified that the whole subject will be presented for the consideration of Congress in a systematic form, and that the principles of its future prosecution can now be settled. The plan originally devised was recommended upon great consideration, and, at the time its initiatory measures were adopted, was calculated for the state of the country. We had just come out of a severe struggle, and had felt the want of adequate preparation, and above all, we had seen and deplored the circumstances which gave the enemy undisturbed possession of the Chesapeake, and its disastrous consequences. And it was to be expected that our arrangements for future defence should be planned upon the then existing state of things. I imagine there were few who did not concur in this sentiment. Because, therefore, some of our works, from the wonderful advancement of the country in all the elements of power, and from the development of new means of annoyance, are larger than are found necessary at this time, still this does not bring into question the wisdom of the original measure. And, as it is, they are most valuable and useful; but the experience we have acquired may be profitably employed in re-examining the plans proposed for the prosecution of the system, and in inquiring whether the change which has taken place in the condition of the country will not justify a corresponding change in the nature of our preparations, and whether we may not depend more upon floating, and less upon stationary defences.

During the period which has intervened since the last war we have nearly doubled in our population, and all our other resources have probably increased in a still greater ratio. Certainly, some of the facilities and means of defence are augmented beyond any rational expectations. The power of transporting troops and munitions of war has already opened new views upon this subject, and such is the progress and probable extent of the new system of intercommunication that the time will soon come when almost any amount of physical force may be thrown upon any point threatened by an enemy. Nashville may succor New Orleans in sixty hours, Cincinnati may aid Charleston in about the same time; Pittsburg will require but twenty-four hours to relieve Baltimore, and troops from that city and from Boston may leave each place in the morning, and meet in New York in the evening. This wonderful capacity for movement increases, in effect, some of the most important elements of national power. It neutralizes one of the great advantages of an assailing force, choosing its point of attack, and possessing the necessary means of reaching it. Detachments liable, under former circumstances, to be cut off in detail, may now be concentrated without delay, and most of the garrisons upon the seaboard may be brought together, and, after accomplishing the object of their concentration, be returned to their stations in time to repel any attack meditated against them.

The improvements which are making in the application of steam have fur-

nished another most important agent in the work of national protection. There can be but little doubt that floating batteries, propelled by this agent, will be among the most efficient means of coast defence. In our large estuaries, such as the bays of New York, of the Delaware, and of the Chesapeake, they will be found indispensable; and one of the most important advantages to be anticipated from the works at Old Point Comfort is the security they will afford to the floating batteries co-operating with them, and which will find a secure shelter in Hampton roads. A hostile fleet about to enter the Chesapeake would certainly calculate the means of annoyance to which it would be exposed by these formidable vessels. During a calm they would take a distant position, insuring their own safety, while, with their heavy guns, they might cripple and destroy the enemy; and their power of motion would enable them, under almost all circumstances, to approach the fleet, and to retire, when necessary, where they could not be pursued. I think it doubtful whether a squadron would anchor in the Chesapeake, or proceed up it, if a competent number of these batteries were maintained and placed in proper positions.

These considerations may well lead us to doubt the necessity of such extensive permanent works, while their non-existence at the time the system was adopted justifies the views which then prevailed; and without advancing any rash conjecture, we may anticipate such improvements in this branch of the public service as will make it the most efficient means of coast defence. These vessels, properly constructed, may become floating forts almost equal to permanent fortifications in their power of annoyance and defence, and in other advantages far superior to them. Being transferable defences, they can be united upon any point, and a few of them be thus enabled to protect various places. We have been brought by circumstances to a more rigid investigation of our means of defence, and to a re-examination of the whole subject. After an interval of twenty years of tranquillity, public sentiment and the attention of the government were, by unexpected circumstances, more forcibly directed to this matter. The result cannot fail to be advantageous. The whole subject can be now re-examined by Congress, with all the benefits which much experience has brought, and with the advantage of adapting a system to the advanced state of the country.

There are two bills for fortifications now pending before Congress. One before the House, amounting to $2,180,000, and intended to prosecute works actually already commenced. The estimates for this bill may therefore be considered necessary in themselves, under any view of the general subject, and not unreasonable in amount for the present year, because they include the operations of two years. The incidental expenses, however, may be safely reduced one-half, as it will not be necessary to make such extensive repairs as were considered requisite when the estimates were prepared.

The bill pending before the Senate contains appropriations for nineteen new works, and for the sum of $600,000 to be expended for steam batteries. The estimates on which this bill was founded were prepared at a time when prudence required that arrangements should be made for a different state of things from that which now exists. An examination of the general system of defence was not then expedient; and the means of protecting the most exposed points, agreeably to information previously collected, were asked of Congress. It was no time then to stop, and instead of prosecuting established plans vigorously, to lose the period of action by surveys, examinations, and discussions. But the opportunity is now afforded, without danger to the public interest, of applying the principles suggested to the works under consideration.

It cannot be doubted but that fortifications at the following places enumerated in this bill will be necessary:

At Penobscot bay, for the protection of Bangor, &c.

At Kennebec river.

At Portland.
At Portsmouth.
At Salem.
At New Bedford.
At New London.
Upon Staten Island.
At Sollers's Flats.
A redoubt on Federal Point.
For the Barrancas.
For Fort St. Philip.

These proposed works all command the approach to places sufficiently important to justify their construction under any circumstances that will probably exist. I think, therefore, that the public interest would be promoted by the passage of the necessary appropriations for them. As soon as these are made, such of these positions as may appear to require it can be examined, and the form and extent of the works adapted to existing circumstances, if any change be desirable. The construction of those not needing examination can commence immediately, and that of the others as soon as the plans are determined upon. By this proceeding, therefore, a season may be saved in the operations.

The other works contained in this bill are:

For Provincetown.—And this proposition may be safely submitted to another inquiry, as the practicability of excluding an enemy from any shelter in Massachusetts bay, a matter of deep interest, and as a work at Provincetown, are closely connected.

For Rhode Island, Narraganset bay.—This work may await the result of the views that may be eventually taken on the subject of fortifying this bay.

For a work at the Delaware outlet of the Chesapeake and Delaware canal.—This may be postponed without injury till next season; and in the mean time a project for the floating defences of the Delaware considered, and perhaps the size of the proposed work reduced.

For a work at the Breakwater.—Until the effect of the deposits which are going on in this important artificial harbor are fully ascertained, I consider it injudicious to erect a permanent work for its defence. Another year will, perhaps, settle the question, and if the result is favorable, an adequate fortification should be constructed here without delay.

For a fort on the Patuxent river, and a fort at Cedar Point.—Both of these works are liable to some of the objections stated, and I think they had better be postponed for more mature consideration.

For fortifications at the mouth of the St. Mary's, Georgia.—This proposition may also be safely submitted to examination.

The estimate for steam batteries may be reduced to $100,000. That sum can be profitably employed.

If these appropriations are early made, most if not all of these works can be put in operation this season, and the money usefully applied, as fast as their progress will justify. And I think the measure would be expedient. But it is to be remembered that the power of the department to push them, during the present year, will depend on the reorganization of the corps of engineers. If that corps is not increased, it will be unnecessary to make the appropriations in the bill before the Senate, as the objects contained in the other bill will be sufficient to occupy the time of the present officers of the corps.

Should it be deemed proper to re-examine the subject of the proposed fortifications generally, I would then recommend that an appropriation of $30,000 be made to defray the expenses of a board, including surveyors, &c.

My reflections upon the whole subject lead to the following practical suggestions on the great subject of the measures for the defence of the country:

1. An augmentation of the navy, upon the principles before stated.

2. The adoption of an efficient plan for the organization of the militia.

Having already, in two of the annual reports I have had the honor to make to you, expressed my sentiments upon this subject, I have nothing new to lay before you, either with relation to its general importance, or to the necessary practical details. I consider it one of the most momentous topics that can engage the attention of Congress; and the day that sees a plan of organization adopted, suited to the habits of our people and the nature of our institutions, and fitted to bring into action the physical strength of the country, with a competent knowledge of their duty, and just ideas of discipline and subordination, will see us the strongest nation, for the purposes of self-defence, on the face of the globe. Certainly such an object is worthy the attention of the legislature.

3. The cultivation of military science, that we may keep pace with the improvements which are made in Europe, and not be compelled to enter into a contest with an adversary whose superior knowledge would give him pre-eminent advantages. War is an advancing science. Many an original genius and many an acute intellect are at all times at work upon it; and the European communities have such a relation to one another that the profession of arms is peculiarly encouraged, and every effort made to place their military establishments, not at the highest numerical point, but in the best condition for efficient service, both with respect to its *morale* and *materiel*. It is not by the mere reading of professional authors that the necessary instruction in this branch of knowledge can be obtained; there must be study and practice; a union of principles and details, which can best be obtained by a course of education directed to this object. This, I think, is one of the greatest advantages of the Military Academy. It cannot have escaped the recollection of those who were upon the theatre of action at the commencement of the last war, that the first year was almost spent in a series of disasters, which, however, brought their advantages. We were comparatively ignorant of the state of military science, and we did not fully recover our true position till we had received many severe lessons: at what an expense of life and treasure need not be stated.

4. The skeleton of a regular establishment, to which any necessary additions may be made, securing, at the same time, economy, with a due power of expansion, and the means of meeting a war with all the benefit of a regularly organized force. This object is attained by our present army.

5. The preparation and proper distribution of all the munitions of war, agreeably to the views hereinafter submitted.

6. I think all the defensive works now in the process of construction should be finished, agreeably to the plans upon which they have been projected

7. All the harbors and inlets upon the coast, where there are cities or towns whose situation and importance create just apprehension of attack, and particularly where we have public naval establishments, should be defended by works proportioned to any exigency that may probably arise.

Having already presented my general views upon this branch of the inquiry, I need not repeat the practical limitations which I propose for adoption. But before any expenditure is incurred for new works, I think an examination should be made, in every case, in order to apply these principles to the proposed plan of operations, and thus reduce the expense of construction where this can properly be done, and, also, the eventual expense of maintaining garrisons required to defend works disproportioned to the objects sought to be attained. I would organize a board for this object, with special instructions for its government.

8. Provision should be made for the necessary experiments, to test the superiority of the various plans that may be offered for the construction and use of steam batteries; I mean batteries to be employed as accessories in the defence of the harbors and inlets, and in aid of the permanent fortifications.

The progressive improvement in the application of the power of steam renders it inexpedient, at any given time, to make extensive arrangements, connected with this class of works, with a view to their future employment. The improvement of to-day may be superseded by the experience of to-morrow; and modes of application may be discovered before any exigency arises rendering a resort to these defences necessary, which may introduce an entire revolution into this department of art and industry. Still, however, experiments should be made, and a small number of these vessels constructed. Their proper draught of water, their form and equipment, the situation and security of their machinery, the number, calibre, and management of their guns, and the best form of the engines to be used, are questions requiring much consideration, and which can only be determined by experience. And there can be little doubt that suitable rewards would soon put in operation the inventive faculties of some of our countrymen, and lead to the tender of plans practically suited to the circumstances. As we acquire confidence by our experience, arrangements could be made for collecting and preparing the indestructible materials for the construction and equipment of these vessels, as far as such a measure may not interfere with any probable change, which at the time may be anticipated in the application of the power of steam.

9. I recommend a reconsideration of the project for fortifying the roadsteads or open anchorage grounds, and its better adaptation to the probable future circumstances of the country.

And I would suggest that the works which are determined on be pushed with all reasonable vigor, that our whole coast may be placed beyond the reach of injury or insult as soon as a just regard to circumstances will permit. No objections can arise to this procedure on the ground of expense, because, whatever system may be approved by the legislature, nothing will be gained by delaying its completion beyond the time necessary to the proper execution of the work. In fact, the cost will be greater the longer we are employed in it, not only for obvious reasons, arising out of general superintendence and other contingencies, but because accidents are liable to happen to unfinished works, and the business upon them is deranged by the winter, when they must be properly secured; and the season for resuming labor always finds some preparations necessary, which would not have been required had no interruption happened.

But the political considerations which urge forward this great object are entitled to much more weight. When once completed we should feel secure. There is probably not a man in the country who did not look with some solicitude during the past season at our comparatively defenceless condition, when the issue of our discussions with France was uncertain, and who did not regret that our preparations, during the long interval of peace we had enjoyed, had not kept pace with our growth and importance. We have now this lesson to add to our other experience. Adequate security is not only due from the government to the country, and the conviction of it is not only satisfactory, but the knowledge of its existence cannot fail to produce an influence upon other nations, as well in the advent of war itself, as in the mode of conducting it. If we are prepared to attack and resist, the chances of being compelled to embark in hostilities will be diminished much in proportion to our preparation. An unprotected commerce, a defenceless coast, and a military marine wholly inadequate to the wants of our service, would indeed hold out strong inducements to other nations to convert trifling pretexts into serious causes of quarrel.

There are two suggestions connected with the prosecution of our works which I venture to make:

First. That the corps of engineers should be increased. The reasons for this measure have been heretofore submitted, and the proposition has been recommended by you to Congress. I will merely add, upon the present occasion, that the officers of this corps are not sufficiently numerous for the performance of the

duties committed to them; and that if an augmentation does not take place, the public interest will suffer in a degree far beyond the value of any pecuniary consideration connected with this increase. And,

Secondly. I think that when the plan of a work has been approved by Congress, and its construction authorized, the whole appropriation should be made at once, to be drawn from the treasury in annual instalments, to be fixed by the law. This mode of appropriation would remedy much of the inconvenience which has been felt for years in this branch of the public service. The uncertainty respecting the appropriations annually deranges the business, and the delay which biennially takes place in the passage of the necessary law reduces the alternate season of operations to a comparatively short period. An exact inquiry into the effect which the present system of making the appropriations has had upon the expense of the works would probably exhibit an amount far greater than is generally anticipated.

The report from the ordnance department shows the quantity and nature of the munitions of war, estimated to be eventually necessary, and their probable cost, including new establishments necessary for their fabrication and preservation. The conjectural amount is $29,955,537.

Believing it is not expedient, at present, to make any preparations upon a scale of this magnitude, I have deemed it proper to accompany this report with a brief statement of my own views, where I depart from the suggestions that are presented in this document.

As our fortifications are constructed, their armaments should be provided; and the amount in *depot* should at all times exceed the anticipated demand, to meet the casualties of the service. We have now on hand 1,818 new cannon for sea-coast defence; and about 1,000 others, most of which are either useless or of doubtful character. The works actually finished, or so far completed as to admit of a part of their armament being placed in them, require about 2,000 guns. They are calculated ultimately to mount about 600 more. Others in the process of construction will require about 1,400. So far we have certain data for our estimates; unless, indeed, which I am inclined to believe, it should not be found necessary ever to provide the full complement destined for the largest of these works. Beyond this, the subject is conjectural. And the quantity needed must depend upon the principles that may be adopted in the further progress of the system of fortifications. There are four private founderies at which the public cannon are cast. These, if their whole attention were devoted to the object, could manufacture from 1,200 to 1,500 annually. As to carriages and other supplies, the amount that could be procured within a reasonable period is almost indefinite. Iron carriages are now made for all the casemate batteries, and they have not only the advantage of indestructibility from the atmosphere, but, requiring no seasoned materials, they may be supplied by the founderies through the country to almost any extent.

We have two armories for the manufacture of small arms, and there are seven private establishments which fabricate arms for the government. All these supplies are of the best description, and are submitted to a rigid inspection, which prevents imposition. The armories can at present turn out about 27,000 arms annually, and probably 11,000 or 12,000 could be made at existing private establishments. Should any exigency require larger supplies, the quantity can be much increased. We have now on hand about 700,000 small arms, and there have been issued to the States about 180,000 muskets, 25,000 rifles, 30,000 pistols, and 378 field cannon and carriages, under the act for arming the militia. If 100,000 of these muskets and rifles are preserved, there are in the country 800,000 of those species of arms belonging to the general or State governments.

What may be considered a proper supply is a question admitting much difference of opinion. It will be seen that the ordnance department fixes the

amount at about 600,000, in addition to what are now on hand, and including the number necessary to arm the militia. We had, at the commencement of the last war, 240,000 muskets, and during its progress 60,000 more were made and purchased. At its termination there were but 20,000 at the various arsenals. The residue were in the hands of the troops, or had been lost in the service. This consumption was greater, I think, than was necessary, or than would probably again take place. A plan of accountability has been introduced, by which the men are charged with the arms they receive, and if these are improperly lost or injured, the value is deducted from their pay. The paymasters cannot settle with them till this matter is adjusted.

The stock of small arms in Great Britain, in depot, in 1817, was ..	818,282
In the public service	200,974
Total.....	1,019,256

The number in depot in France, in 1811, was 60,000, not including the great number in service.

My own impression, is that 1,000,000 small arms may be considered a competent supply for the United States; and if so, a large deduction may be made from the estimate of the ordnance department under this head of expenditure. Although the component materials of these arms are almost imperishable, still it is not expedient to keep a stock unnecessarily large on hand; because there is not only some risk and expense in their preservation, but because, like every other article manufactured by man, they are no doubt susceptible of great improvement. And it may be that those now made may be superseded by an improved model, which, once introduced, must be adopted, at whatever expense or inconvenience, by all nations. And the ingenious invention lately exhibited in this city, by which a series of balls, in separate charges, are brought by a rotary motion to a common place of discharge, suggests the possibility of a revolution in the form of our fire-arms.

On the subject of depots for these arms, I accord with the general suggestions made by the colonel of ordnance. I think the number should be increased, and arms placed in every part of the country, ready to be used as circumstances may require.

It will be observed that, in the estimate I have made, I confine myself to the armament for the public service, connected with the actual defence of the country, whether to be used by the army or militia in time of war, but I do not extend my views to a supply for arming the militia, in order to discipline them in time of peace. The extent of this policy is a question not necessary in the consideration of the subject before me.

As the arms in *depot* approach whatever number may be assumed as the proper maximum, the necessity for additional armories becomes less. When our stock is once completed, the present armories, without any aid from the private establishments, will be able to supply the annual consumption. I think, therefore, that two additional armories, as suggested by the ordnance department, are not wanted. And, indeed, although there are considerations attending the transportation of the rude and the manufactured article, and other circumstances which would justify the establishment of a new armory upon the western waters at present, yet if the measure is not carried into effect soon its importance will annually diminish.

But a national foundery for cannon, both for the military and naval service, and perhaps two in different sections of the country, should be erected without delay. The best interests of the public require it. But I have nothing to add to the suggestions made upon this subject in my last annual report.

As to field artillery, the extent to which it shall be provided must depend

upon the views of the legislature concerning the expediency of issuing it to the militia. If a more efficient organization does not take place I think the expenditure on this account may well be saved to the public treasury. I consider all attempts to improve the condition of the militia upon the present plan as so nearly useless that the whole system has become a burden upon the public without any corresponding advantage. The principal benefit which results from the existing state of things is the power to call into service such portions of the population as may be wanted. But this may be attained by a simple classification without the cumbrous machinery which at present creates expense and trouble, and which, while it promises little, performs still less.

Very respectfully, sir, I have the honor to be, &c.,

LEWIS CASS.

The PRESIDENT *of the United States.*

ENGINEER DEPARTMENT,
Washington, March 30, 1836.

SIR: In compliance with your instructions, I have the honor to submit herewith the copy of a report prepared in fulfilment of the requirement of the first inquiry contained in the resolution of the Senate of the 18th of February last. The views presented by Colonel Totten on the subject are full and explicit, and are consonant with the principles heretofore advocated by this department. The report is therefore respectfully submitted without any further comments.

Very respectfully, sir, your most obedient servant,

C. GRATIOT,
Chief Engineer.

Hon. LEWIS CASS, *Secretary of War.*

WASHINGTON, *March* 29, 1836.

SIR: In compliance with your request, I have the honor to hand in some remarks on the fortification of the frontier of the United States.

And am, sir, very respectfully, your most obedient,

JOS. G. TOTTEN,
Lt. Col. Eng. Brevet Colonel.

Brig. Gen. CH. GRATIOT,
Chief Engineer, Washington.

In presenting a summary statement of the general system of defence of the country by fortifications, as proposed and in part executed, it is proper to refer for much information as to localities, as to particular projects, and for statements and arguments somewhat elaborate, to communications made at different times by the board of engineers for fortifications.

These communications, of a nature forbidding too great publicity, are to be found in the records of the War Department in the shape of reports of the board of engineers of 1817, 1819, 1820, 1821, 1822, 1823, 1824, and 1825. Reference may also be made with advantage to the revised report of the board of engineers presented in 1826, and publisheed as document No. 153 of the state papers of the first session of the nineteenth Congress. The report of 1826, just referred to, was drawn up by the undersigned, and was the work of

much research and of mature deliberation; and in giving it now a careful perusal, he thinks that the information now called for by the Senate cannot be better afforded, at least by him, than by again presenting that report, occasionally condensing, curtailing, or omitting portions of the argument and certain descriptions, and adding such new facts as may have been developed by further research, or made more prominent and interesting by the progress of improvement in the country.

The elements going to make up the general system of maritime defence are a navy, fortifications, interior communications by land and water, and a regular army, and well organized militia.

The navy must be provided with suitable establishments for construction and repair; stations, harbors of rendezvous, and ports of refuge. All these must be covered by fortifications having garrisons of regular troops and militia, and being supplied with men and materials through the lines of interior communications. Not being required to remain in the harbors for their defence, the navy, pre-eminent as an offensive arm, will be prepared to transfer the war to distant oceans and to the shores of the enemy, and to act the great part which its early achievements have foretold, and to which its high destiny will lead.

Fortifications should, 1st, close all important harbors against an enemy, and secure them to our military and commercial marine;

2d. Should deprive an enemy of all strong positions where, protected by naval superiority, he might maintain himself during the war, keeping the whole frontier in constant alarm;

3d. Must cover the great naval establishments from attack;

4th. Must protect the great cities;

5th. Must prevent, as far as possible, the great avenues of interior navigation from being blockaded at their entrances to the ocean;

6th. Must cover the coastwise and interior navigation, by closing the harbors and the several inlets which intersect the lines of interior communication, thereby further aiding the navy in protecting the navigation of the country; and

7th. Must shelter the smaller towns along the coast, and also all their commercial and manufacturing establishments which are of a nature to invite the enterprise or cupidity of an enemy.

Interior communications will conduct, with certainty, the necessary supplies of all sorts to the stations, harbors of rendezvous and refuge, and the establishments of construction and repair for the use both of the fortifications and of the navy; will greatly facilitate and expedite the concentration of military force, and the transfer of troops from one point to another; will insure to these troops supplies of every description, and will preserve, unimpaired, the interchange of domestic commerce, even during periods of the most active external warfare.

The army and militia, together with the *personnel* of the marine, constitute the vital principle of the system.

It is important to notice the reciprocal relation of these elements of national defence; one element is scarcely more dependent on another, than the whole system is on each one. Withdraw the navy, and the defence becomes merely passive; we expose ourselves the more to suffer the evils of war, at the time that we deprive ourselves of all means of inflicting them. Withdraw *interior communication*, and the *navy* will often be greatly embarrassed for want of supplies, while the fortifications will be unable to offer full resistance for want of timely re-enforcements. Withdraw *fortifications*, and the interior communications are broken up, and the *navy* is left entirely without collateral aid.

That element in the system of defence, which is now to be attended to, is the *fortification* of the frontier. It may not be unprofitable here to go somewhat more into detail, as to the relation of this with the other members of the system;

the rather, as the reasons for some conclusions hereafter to be announced will be the more apparent.

In considering the relation of fortifications, and of the navy, to the defence of the country, it will appear that the functions of the latter are not less appropriately offensive than those of the former are necessarily defensive; the latter loses much of its efficiency as a member of the system the moment it becomes passive, and should in no case (referring now to the navy proper) be relied on as a substitute for fortifications.

The position, it is thought, may be easily established.

If our navy be inferior to that of the enemy, it can offer, of course, without collateral aids, but a feeble resistance, single ships being assailed by fleets or squadrons. Having numerous points along our extended frontier to protect, all of which must be simultaneously guarded, because ignorant of the selected points of attack, the separate squadrons or vessels may be captured in detail, although the naval force be, in the aggregate, equal or superior to the enemy's. Should we in such a case venture to concentrate, under the idea that the particular object of the adversary was foreseen, he could not fail to push his forces upon the places thus left without protection. This mode of defence is liable to the further objection of being exposed to fatal disasters, independent of assaults of an enemy, and of leaving the issue of conflicts to be determined sometimes by accident, in spite of all the efforts of courage and skill. If it were attempted to improve upon this mode, by combining with it temporary batteries and field-works, it would be found that, besides being weak and inadequate from their nature, the most suitable positions for these works must often be neglected, under the unavoidable condition of security to the ships themselves. If the ships take no part in the contest, the defence is of course relinquished to the temporary batteries; if the ships unite in the defence, the batteries must be at hand to sustain them, or the ships must strike to the superior adversary. Placing these batteries in better position, and giving them greater strength, is at once resorting to defence by fortifications; and the resort will be the more effectual, as the positions are better chosen, and the works better adapted to the circumstances.

On the great comparative expense of such a mode of defence, which will be quite apparent after a little reflection, only one or two very brief remarks will be made, viz: The expense incurred by the nation defending itself on this plan will, from the first, greatly exceed that incurred by the attacking party; because, to resist a single fleet threatening the coast, there must be provided as many equal fleets as there are important objects inviting the attack of the enemy, and even with this costly preparation, all lesser objects are thrown upon his forbearance. These defences, moreover, being perishable in their nature, will need frequent removal and repair.

On the other hand, the proper fortification of the coast, preventing the possibility of a blockade so strict as not to afford frequent opportunities for our navy to leave the harbors, our ships, no longer needed for passive defence, will move out upon their proper theatre of action, though inferior to the enemy, with confidence; knowing that, whether victorious, whether suffering from the violence of tempests, or whether endangered by the vicinity or the pursuit of a superior force, they can strike the extended coast of their country (avoiding the more important outlets, where alone a considerable blockading force may be supposed to lie) at numerous points where shelter and relief await them; hovering around the flanks and in the rear of blockading fleets, and recapturing their prizes; falling upon portions of these fleets, separated for minor objects, or by stress of weather; watching the movements of convoys, in order to pick up straggling vessels; breaking up or restraining the enemy's commerce in distant seas; meeting by concert at remote points and falling in mass upon his smaller squadrons, or upon his colonial possessions, and even levying contributions in his un-

protected ports; blockading for a time the narrow seas, and harassing the coasting commerce of the enemy's own shores. These are objects which our own history shows may be accomplished, although contending, by means of a navy as to numbers apparently insignificant, against a marine whose force and efficiency have never been paralleled. Our own history shows, besides, that the reason why our infant navy did not accomplish still more, was that the enemy, possessing himself of unfortified harbors, was enabled to enforce a blockade so strict as to confine a portion of it within our waters. That this portion, however, indeed, that all was not captured, can be attributed only to respect—so misplaced that it could be the result of ignorance only—for the then existing fortifications; a result amply compensating the nation for the cost of those imperfect works. It would be difficult, nay, impossible, to estimate the full value of the results following the career of our navy, when it shall have attained its state of manhood, under the favorable conditions heretofore indicated. The blockade of many and distant parts of our coast will then be impossible, or, rather, can then be effected only at enormous cost, and under the risk of the several squadrons being successively captured or dispersed; the commerce of our adversary must be nearly withdrawn from the ocean, or it must be convoyed, not by a few vessels, but by powerful fleets. In fine, the war, instead of resulting in the pillage and conflagration of our cities and towns, in the destruction of our scattered and embayed navy, and of the expensive establishments pertaining to it, in the interruption of all commercial intercourse between the several portions of the maritime frontier, in the frequent harassing, and expensive assemblage of militia forces, thereby greatly lessening the products of industry, and infusing among this most valuable portion of our population the fatal diseases and the demoralizing habits of a camp life; instead of these and innumerable other evils attendant upon a conflict along and within our borders, we should find the war and all its more serious evils shut out from our territory by our fortresses, and transferred by our navy to the bosom of the ocean, or even to the country of the enemy, should he, relying on a different system, have neglected to defend the avenues by which he is assailable.

Our wars, thus becoming maritime, will be less costly in men and money, and at the same time more in unison with our institutions—forging no weapon for defence capable of being turned, under other circumstances, against the life of the State; and keeping our domestic industry and relations, under our internal financial resources, beyond the reach of assault from without.

It is an incontestible principle in military science, and one fully illustrated by military history, that the worst mode of waging war, although strictly a defensive one in its origin and its object, is to permit its field of action to lie within our own borders; and that the best mode is that which longest sustains an offensive attitude. In our own case, war can be excluded from our territory only by fortifications; and we can assume the offensive, with the greatest portion of mankind, only through our navy. The construction of the former secures the means of creating, equipping, and repairing the latter, and leaves it unencumbered with duties which it imperfectly performs, to the full exercise of its great and appropriate functions. In accordance with these principles, what, in general terms, is the extent to which the government may be called on to prepare itself in fortifying the coast and in building up the navy?

It is not in human forecast to decide upon the station of the latter a generation hence. Political events may force the nation to place herself more nearly on a level with some of the greatest of maritime powers, or the prevalence of peaceful relations may restrict the growth of the navy to that demanded by the increase, rapid and extensive, of our commercial interests. But whatever may be the amount of enlargement of the naval force, whether greater or less; or whatever the mode, whether progressive and regular, or by sudden expansion, its increase will involve no corresponding extension in the number or strength

of the fortifications, because these must be adequate to their object of themselves, and must consequently be, with some exceptions, as numerous and as strong while the navy is small, as when the navy shall have attained its maximum. A considerable enlargement of the naval force might build up new naval establishments, thereby, in raising the importance of certain positions, calling for stronger defences.

The growth of the country in wealth and numbers will convert certain places, now presenting no inducements to the enterprise of an enemy, into rich and populous cities. But, with the exception of these cases, and such as these, it may be assumed that a good system of fortifications applied now to the maritime frontier will be equal to its object in all future times.

Conceiving it unnecessary to enlarge further on this part of the subject, a few remarks will be offered on the correlative influence of *fortifications* and *interior communications*.

The most important of these communications, in reference to a system of defence, are, first, such as serve to sustain, in all its activity, that portion of domestic commerce which, without their aid, would be interrupted by a state of war; and second, such as serve, besides their great original purposes, to conduct from the interior to the theatre of war necessary supplies and timely relief. The first, which are among the most important national concerns of this nature, lie parallel to, and not far from, the coast; the second, which, when they cross the great natural partition-wall between the east and the west, are equally important, lie more remote from the coast, and sometimes nearly or quite parallel to it, but generally fall, nearly at right angles to the line of the seaboard, into the great estuaries, where, in some cases, their products are arrested, or whence, in others, they flow or mingle with those of the first. To fulfil the object of the first-mentioned lines of communication, it is obviously necessary to prevent an enemy from reaching them through any of the numerous inlets from the sea which they traverse, including, of course, the great inlets wherein these unite with the communications coming from the interior. The security of the coastwise line, therefore, involves the security of the other, and is, in a great measure, indispensable to it. From such considerations as have been already presented, it is inferred that, for the security here required, we must, as in the case of cities, harbors, naval establishments, &c., look to fortifications. But it fortunately happens, as will appear in the sequel, that wherever both objects exist, the works necessary for the one may often, if not always, be made to accomplish both. In reference to a system of defence for the protection of these lines of communication, it must be observed that, from the facility with which they may be broken up, and the serious evils consequent thereon, they offer to the enemy great inducements to enterprises of that nature. An aqueduct, an inclined plane, a tide-lock, a dam, an embankment blown up, is the work of an hour, and yet would interrupt the navigation perhaps for months.

The necessity of a regular army, even in time of peace, is a principle well established by our legislation. The importance of a well-organized militia is incident to the nature of our institutions, well understood by the people, duly appreciated by the government, and finely illustrated in our history. Nothing therefore, need be said on these subjects, considered as general principles. It may, however, in a succeeding part of this communication, be deemed proper to hazard a conjecture or two touching the expediency of a peculiar organization of the latter.

Before going further, it is proper to be more explicit as to the sense in which the terms "*navy*" and "*fortifications*" have been employed.

By the term *navy*, only that portion of our military marine which is capable of moving in safety upon the ocean, and transferring itself speedily to distant points, is meant. Floating batteries, gunboats, steam batteries, &c., these, and indeed, all other modes of defence which are restricted in their sphere of action

tied down to local defence, and are produced chiefly in cases where the localities deny to fortifications their best action, are regarded as auxiliary to fortifications, and as falling within the same category. Under the term "fortifications," used as expressive of security afforded thereby to the seaboard, have been included permanent and temporary fortifications, the auxiliaries just mentioned, and both fixed and floating obstructions to channels.

The circumstances which must govern in framing a system of fortifications are—

1st. The importance of the objects to be defended. Great naval establishments, great cities, &c., invite to greater preparation on the part of an enemy, and demand corresponding means of resistance.

2d. The natural advantages or disadvantages of the position to be fortified. It will often happen that the defence of a position of great consequence can be effected with smaller works, and at less expense, than a place of much less value. It will not follow, therefore, that the *expense* of fortifications will be proportionate to the importance of the object, though it is indispensable that the strength should be.

3d. The species of attack to which the place is liable. Some places will be exposed only to capture by assault; others by siege; others to reduction by cannonade, bombardment, or blockade; and some to a combination of any or all these modes. If the enemy against which we fortify be unprovided with artillery, the mode of fortifying becomes peculiar.

4th. Whatever may be the circumstances, it is of vital importance that all the works should be fully adequate to the object, and that they should, even with a small garrison, be perfectly safe from a *coup de main*.

Proceeding now to a concise description of the maritime frontier, considered as a whole, the several sections will be afterwards separately examined, applying as we go to the several positions the works already projected, and pointing out as far as practicable such as remain to be planned. The sea-coast of the United States is comprised within the 24th and 46th degrees of north latitude, and spreads over 27 degrees of longitude. The general direction of that part which lies on the Atlantic, north of the peninsula of Florida, is N.NE. and S.SW. This peninsula stretches out from the continent in a direction a little east of south; while that part which lies on the Gulf of Mexico corresponds nearly with the 30th parallel of north latitude.

Without estimating any of its indentations not properly belonging to its outline, and carrying our measure from point to point wherever the breaks are at all abrupt, the line of coast may be stated to be 3,300 miles in length.

Nearly parallel with the Atlantic coast extends a chain of mountains separating the sources of rivers flowing, on the one hand, directly into the ocean from those which run into the Gulf of St. Lawrence or the Gulf of Mexico. Even in the most lofty portion of this chain numerous gaps afford facilities for crossing by roads or railways.

Occasional expansions, at high elevations, present sufficient surface to afford the water required for crossing by canals; and, in other places, the rivers themselves have severed the chain, leaving no impediments to communications of either kind. On both sides of these mountains the country offers numerous natural means of intercommunication, and facilities and inducements for the creation of artificial ones in endless combination.

From this general description it may be deduced that, notwithstanding the great extent of our seaboard, the safety of each section of it is a matter not devoid of interest to every portion of the people, however remote geographically, at least so long as the nation shall continue her commercial relations with the rest of the world; and, indeed, until she shall find it her interest to interdict the circulation of domestic commerce through the avenues which nature or art may

have created—a commerce of inestimable value at all times, and becoming more necessary, as well as more valuable, on every interruption of foreign traffic.

As lying closely connected with the coast, it will be convenient to describe briefly in this place that line of interior communication on which, in time of war, reliance must be placed as a substitute, in part, for the exterior coasting navigation of peace.

Beginning in the great bay to the north of Cape Cod, it passes overland either into Narraganset roads or Buzzard's bay; thence through Long Island sound to the harbor of New York; thence up the Raritan, overland to the Delaware, down this river some distance, overland to the Chesapeake, down the Chesapeake, up Hampton roads and Elizabeth river, through the Dismal swamp to Albemarle sound; thence through the low lands, swamps, or sounds of the Carolinas and Georgia to the head of the peninsula of Florida; thence overland to the Gulf of Mexico; thence through the interior sounds and bays to New Orleans, and thence through low lands, swamps, and bayous to the western boundary. Some of the few and brief natural interruptions of this extensive line have already been removed; some are rapidly disappearing before the energy of local or State enterprise, and to the residue the public attention is directed with an earnestness which leaves no reason to fear that they will not in due time be overcome. In all cases where this line becomes much exposed to an enemy from the difficulty of fortifying broad waters, communications more inland are even now afforded, or are in progress by canals or railroads, which will be perfectly safe.

Proceeding now to a more minute examination of the coast, it will be convenient to divide it into four distinct parts, namely: the northeastern, extending from the English province of New Brunswick to Cape Cod; the middle, from Cape Cod to Cape Hatteras; the southern, from Cape Hatteras to Cape Sable; and the Gulf of Mexico frontier from Cape Sable to the Mexican borders. They will be taken up in the order in which they stand above.

THE NORTHEASTERN SECTION OF THE COAST.

The northeastern section is characterized by its serrated outline and its numerous harbors; and, though differing in these respects entirely from the other sections, is not less distinguished in its climate than by the prevalence, at certain seasons, of dense and lasting fogs. The extent of this section, measuring from point to point wherever the breaks of the coast are abrupt, is about five hundred miles, while a straight line from Cape Cod to Quoddy Head is hardly half that distance. The eastern half of this coast is singularly indented by deep bays, the shores being universally rocky, and having numerous islands surrounded by deep water, which not only add to the number of harbors, but afford, besides, an interior navigation well understood by the hardy coasters of this section, and measurably secured by its intricacies and the other dangers of this foggy and boisterous region from interruption by an enemy. The western half, though it has two very prominent capes and a few deep bays, is much less broken in its outline than the eastern. It is covered by few islands, in comparison, but contains, nevertheless, several excellent harbors.

The eastern harbors of Maine are exposed in a peculiar manner. They are not only on the flank of our line, but they are also quite near to public establishments of the greatest maritime powers; they are, moreover, as yet, backed by a sparse population only, and are consequently both weak and exposed. The time cannot be very distant, however, when, becoming wealthy and populous, they will be the objects of a full portion of the public solicitude. Works designed for these harbors must therefore be calculated for the future—must be founded on the principle that they are to defend places much more important than any now existing there; that, being very near the possessions of a foreign power, they will be, in a particular manner, liable to sudden and to repeated

attacks; and that, lying at the extremity of the coast, they can be only tardily succored. The works erected on this part of the coast should be so strong as to resist escalade, and to hold out long enough for the arrival of relief. Feebler works than these might be more injurious than beneficial; their weakness would, in the first place, invite attack, and it being a great advantage to occupy fortified places in an adversary's territory, the enemy would prepare himself to remedy the military deficiencies of these forts by adding temporary works, by the force of his garrisons and the aid of his vessels.

No surveys have been made of these harbors and no plans formed for their defence. It may be well to observe here, once for all, that much confidence is not asked for the mere conjectures presented below as to the number and cost of the works assigned for the protection of the harbors which have not yet been surveyed. In some cases there will be mistakes as to the number of forts needed, and in others the errors will be in the estimated cost, but the errors will probably as often lie on one side as on the other, so that the sum total may be a sufficient approximation to the truth.

This is the place to state, also, that the early estimates furnished for the projected works require considerable augmentation. The explanation of this is easy. In preparing those estimates the board of engineers obtained lists of prices from different sections of the country, and adopted them as accurate. Whether the lists thus furnished referred to materials and workmanship of inferior quality, or because they were drawn up at a period of unusually low prices, it has been found by experience that these prices were almost all too low. The board calculated with great care and labor, and with perfect honesty of purpose, applying the prices just mentioned to all the quantities susceptible of measurement and calculation; and they applied themselves with no less diligence and good faith to the estimate of expenses of a contingent nature, and, for the greater part, not to be foreseen with accuracy, either as to amount or kind. Having no experience in large constructions, these last were at least but conjectures; and, as the history of constructions on several parts of the coast has since shown, they were much too small. In consideration of these deficiencies, of the present great elevation of prices, and of the liability to great increase of cost from occasional interruptions of progress and breaking up of systems of operations, it is thought that about fifty per centum should be added to the amounts given in the estimates.

Eastport and Machias may be brought forward as places that will unquestionably be thought to need defensive works by the time, in the order of relative importance, the execution of them can be undertaken by the government. There are several small towns eastward of Mount Desert island that may, at that period, deserve equal attention. At present, however, the places named above will be the only ones estimated for, and $100,000 will be assumed as the cost of each.

Mount Desert island, situated a little east of Penobscot bay, and centrally as regards the Kennebec and St. Croix rivers, having a capacious and safe roadstead, affording anchorage for the highest class of vessels, and easily accessible from sea, offers a station for the navy of an enemy superior to any other on this portion of the coast. From this point his cruisers might act with great effect against the navigation of the eastern coast, especially that of Maine, and his enterprises of every kind could be conducted with great rapidity against any point he might select. These considerations, added to the advantages which would result in certain political events from our occupying so advanced a station, whence we might act offensively, together with the propriety of providing places of succor on a part of the coast where vessels are so frequently perplexed in their navigation by the prevailing fogs, lead to the conclusion that the fortification, in a strong manner, of this roadstead, is highly necessary. A survey of this island was begun many years ago, but the party being called off to other duties, it was

never completed; the project of defensive works has not been formed. The entire cost may be, as assumed by the engineer department, $500,000.

Castine.—It would seem to be impossible on this coast to deprive an enemy, enjoying naval superiority, of harbors, or to prevent his using them as stations during the war, insular situations, which his vessels would render unapproachable, being so numerous; but it seems proper that those positions of this nature, which are at the same time the sites of towns, should be secured against his visitations. During the last war the English held the position of Castine for some time, and left it at their own pleasure. It is probable that a work costing about $50,000 would deter an enemy from again making choice of this position.

Penobscot bay.—Upon this bay, and upon the river of the same name flowing into it, are several flourishing towns and villages. Of the many bays which intersect this coast, the Penobscot is the one which presents the greatest number of safe and capacious anchorages. As before observed, a large portion of these harbors must, for the present, be left without defences, but the valuable commerce of the bay and river must be covered, and to afford a secure retreat for such vessels as may be unable to place themselves under protection of the works to the east or west of the bay, the passage of the river must be defended. The lowest point at which this can be done, without great expense, is at the narrows opposite Bucksport. A project has been given in for a fort at that position, now estimated at $150,000.

West of the Penobscot comes *St. George's bay, Broad bay, Damariscotta,* and *Sheepscot,* all deep indentations, and leading to towns, villages, and various establishments of industry and enterprise of greater or less present value and future promise. These have not been surveyed, and, of course, no plans have been formed for their defence; $400,000 are assigned to the fortification of these waters. The Sheepscot is an excellent harbor of refuge for vessels of every class.

Kennebec river.—This river, one of the largest in the eastern States, enters the sea nearly midway between Cape Cod and the mouth of the St. Croix. It rises near the source of the Chaudierre, a tributary of the St. Lawrence, and has once served as a line of operations against Quebec. The situation and extent of this river, the value of its products, and the active commerce of several very flourishing towns upon its banks, together with the excellence of the harbor within its mouth, will not permit its defence to be neglected. Surveys incomplete—estimated cost of defences, as formed by the engineer department, $300,000.

Portland harbor.—A little to the northwest of Cape Elizabeth is the harbor of Portland. The protection of the town, of the merchantmen, and of the ships-of-war that may be stationed there to guard the coast or that may enter for shelter, all of them important objects, may be secured, as an inspection of the map of the town and harbor will show, by occupying Fort Preble Point, House island, Hog Island ledge, and Fish Point. At the same time, if the two channels to the west and east of Hog Island ledge can be obstructed at small expense, which is hardly a matter of doubt, although some final surveys are necessary to decide this point, there will be no necessity for a battery on the ledge; and Fish Point need be occupied only by such works as may be thrown up in time of war. The expense, as now estimated, of the works planned for the defence—not including the defence of Hog Island channel, of which the mode has not been settled—will be $155,000 for Fort Preble, and $48,000 for House island. For Hog Island channel, say $135,000.

The mouths of the Saco, Kennebunk, and York.—Comparatively small works will, it is thought, adequately cover these places, and $75,000 is assumed as their aggregate cost.

Portsmouth Harbor.—The only good roadstead, or good harbor, between Cape Elizabeth and Cape Ann, is Portsmouth harbor, within the mouth of Piscataqua

river. Line-of-battle ships can ascend this river as high as Fox Point, seven miles above the town of Portsmouth. Between this point and Shooting Point is a branch of the river communicating with Great bay. This branch, which is one-third of a mile wide, presents, for two miles in length, an excellent cover for all sorts of vessels. This situation, sufficiently commodious for a secondary depot, designed to repair vessels of war seeking an asylum in this river, is too near the sea for a great naval depot; and, in other respects, does not possess the advantages of Boston, as was shown in the report of the board of engineers, 1820. Still, as Portsmouth is an excellent harbor and station, and as it is indispensable that some, at least, of these stations be provided with the necessary establishments for repairs, the depot in this river should be maintained. It is to be regretted that the bay to the south of Fox Point was not chosen as the site of the navy yard instead of Fernal's island. Being where it is, it will be necessary, in time of war, to make some particular dispositions for the protection of the yard from an attack from the north shore of the river.

The position of Fort Constitution must certainly, and that of Fort McCleary may possibly, be occupied by these defences; though the works themselves, especially the first named, must give place to such as will better fulfil the object. The other positions for forts are Gerrish's Point, —— island, and Clark's island; some, if not all, of which must be occupied. Some final surveys must be made before the necessary works can be accurately determined on, and before estimates can be made; but there is reason for believing that the entire expense of fortifying this harbor will not fall short of $500,000.

Newburyport harbor.—This is the next port south of Portsmouth. The Merrimack river, the mouth of which forms this harbor, is obstructed at its junction with the sea by a bar, on which there was formerly but six or seven feet of water at low tide. This entrance has since, however, been thought to be essentially important, and, at any rate, it leads to a beautiful, prosperous, and wealthy city. The points forming the mouth of the river are continually changing their form and position; near the middle of the present channel is said to be the spot once occupied by a fort. Under such circumstances, it seems advisable to rely, for the defence of this harbor, on forts to be thrown up on the approach of war, unless the works of harbor improvement now in progress shall be found to give stability to the points in question. It is thought that $100,000 would defend this entrance adequately.

Gloucester harbor.—The position of this harbor, near the extremity of Cape Ann, places it in close relation with the navigation of all Massachusetts bay, and gives it an importance beyond what would be assigned to it on account of its local interests. No surveys have yet been made, but it is believed that sufficient defences may be provided for $200,000.

Beverly harbor.—This harbor will be defended chiefly by a portion of the works designed for Salem; $50,000, in addition, will secure it.

Salem harbor.—The port of Salem is distant from Marblehead two miles, being separated therefrom by a peninsula. The occupation of the extremity of Winter island, (where are the ruins of Fort Pickering,) on one side, and of Naugus Head on the other, will effectually secure this harbor. Projects have been presented for this defence, now estimated at $225,000.

Marblehead harbor.—Besides covering, in some measure, the establishment at Boston, the harbors of Marblehead and Salem possess an important commerce of their own, and also afford shelter for vessels prevented by certain winds from entering Boston or pursuing their course eastward. The mode of defending Marblehead harbor, proposed by the board of engineers, consists in occupying, on the north side, the hillock which commands the present Fort Sewall, (which will be superseded by the new work,) and on the south, the position of Jack's Point. The two works will cost $318,000.

Boston harbor.—We come now to the most important harbor in the eastern

section of the coast, and, considering its relation to general commerce and the interests of the navy, one of the most important in the Union. After a careful examination of all the necessary conditions of such a problem, the board of naval officers and engineers, in their joint report of 1820, gave this harbor a preference over all other positions to the east, and, inclusive of New York bay and the Hudson, as the seat of the great northern naval depot. For reasons, at large, for this selection, reference is made to the report of 1820. But, even should the recommendation therein contained remain unsanctioned, still Boston is a city of great wealth, possesses an extensive and active commerce, and contains already within its harbor an establishment on which great reliance is placed to give growth and energy to our navy. The present forts in Boston harbor defend merely the interior basin from attacks by water, but as it often happens that vessels enter Nantasket roads with a wind too scant to pass the narrows, or are detained in President roads by light winds or an adverse tide; as the former, especially, is a very convenient anchorage, from whence to proceed to sea; and above all, as Nantasket roads afford the best possible station for a blockading squadron, it was deemed indispensable to place permanent defences at the mouth of the harbor. The project of the defence regards the existing works, with the necessary repairs and modifications, as constituting a second barrier; contemplates placing a permanent fort on George's island; another at Nantasket Head, having two advanced works on the head and one on Hog island; reducing the latitude of Gallop island, in order to destroy its command over George's island; and filling up the Broad Sound channel, so as to leave no passage, in that direction, for ships-of-war. These are estimated to cost $2,337,000. Besides the works of a permanent character, it will be necessary, in the beginning of a war, to erect several temporary works in the lower part of the harbor, in order to make that defence more perfect, and also on certain lateral approaches to the navy yard.

Plymouth and Provincetown harbors.—These are the only harbors on the northeastern section of the coast south of Boston. They have a commerce of some consequence of their own; but they are particularly interesting in reference to the port of Boston, and to the transition from the middle to the eastern section of the coast, in which respect they would become still more important should the proposed canal from Buzzard's to Barnstable bay ever be executed. While these harbors are undefended, an enemy's squadron blockading Massachusetts bay will have ports of refuge under his lee of which he would not fail to avail himself to maintain his blockade, even throughout the most stormy seasons, knowing that the wind which would compel him to seek shelter would be adverse to outward-bound, and fatal, should they venture near the cape, to inward-bound vessels. While in possession of these harbors, an enemy would have constantly under his eye the harbor of Boston, the passage round Cape Cod, and that through the canal. To these considerations, going to establish the necessity of securing these harbors by proper defences, it must be added that, being thus deprived of the shelter afforded by these ports, an enemy would be unable to enforce a rigorous investment. In the first place, he would be often deterred from taking a station near the land, lest he should be caught embayed by the violent easterly winds prevailing at certain seasons; in the next place, he would always take a good offing on every distinct indication of these winds, thereby leaving a clear coast to be profited of by our own vessels at the first instant of a change of weather. Our own vessels, coming in from sea, and finding an enemy interposed between them and Boston, or being turned from their course by adverse winds, would, in case of the defence of these harbors, find to the south of Boston a shelter equivalent to that provided to the north by the fortifications of Marblehead, Salem, Gloucester, and Portsmouth.

The surveys of these harbors have not been handed in, and no plans have been formed for their defence. Plymouth harbor may be suitably defended, it

is thought, by the occupation of Gurnet Point, and at no great expense; while it is thought that, to fortify Provincetown harbor in such a way as to cover vessels taking shelter therein, and at the same time to deprive an enemy of all safe anchorages, will involve considerable expense, probably no nearer estimate can be formed at present than that offered by the engineer department, which gave $100,000 to Plymouth and $600,000 to Provincetown.

Should the canal above mentioned be executed, it will be necessary to place a small work at each of its outlets, to prevent the destruction of the means by which the transit of vessels in and out of the canal must be accomplished.

MIDDLE SECTION OF THE COAST.

The coast between Cape Cod and Cape Hatteras differs from the northeastern section in possessing fewer harbors, in having but little rocky and a great portion of sandy shore, wherein it resembles the southern section; in its milder climate and its clearer atmosphere; and it differs from all the other portions in the depth and magnitude of its interior seas and sounds, and in the distance to which deep tide navigation extends up its numerous large rivers.

The circuit of the coast, not including the shores of the great bays, measures 650 miles, while a straight line from one of the above-named capes to the other measures about 520 miles.

Martha's Vineyard sound.—To the south of Cape Cod lie the islands of Nantucket and Martha's Vineyard, which with several smaller islands on the south, and the projection of Cape Malabar on the east, enclose Martha's Vineyard sound. The channels through this sound being sufficient for merchant vessels, and one of them allowing the passage even of small frigates, are not only the constant track of coasting vessels, but owing to the relative situation of Long Island sound and Narraganset roads, and to the existence of two tolerably safe harbors at convenient distances east of Gayhead, namely, Tarpaulin sound and Holmes's Hole, the sound is generally aimed at by all eastern vessels arriving from foreign voyages in the tempestuous months. There are certain difficulties, however, attending the navigation of this sound, arising from the want of a harbor near the eastern extremity, which have suggested the project of an artificial harbor at the northeast point of Nantucket island. Besides these harbors on the direct route through the sound, there are the harbors of Nantucket, Edgartown, and Falmouth.

In addition to the many thousand vessels which pass this water annually, of which there are sometimes forty or fifty, a portion containing the most valuable cargoes, to be seen in the harbors awaiting a change of wind, there is supposed to be at least 40,000 tons of shipping owned in the towns of this sound, and employed in the whale fishery. If this portion of the coast is to be defended at all, it must be by fortifications, for there is no population scarcely, except that of the towns, and this is believed to be entirely without military organization. A privateer might run into either of these harbors and capture, destroy, or levy contributions at pleasure; $250,000 may perhaps suffice for the defence of all these places against the kind of enterprises to which they are exposed.

Buzzard's bay.—Interposed between the island of Martha's Vineyard and the main are the Elizabeth islands, bounding Buzzard's bay on the south. This bay, although of importance as leading to the proposed canal to Barnstable bay, as covering the flourishing town of New Bedford, and as being one of the natural harbors to be used by an enemy in forcing the blockade of Narraganset roads, cannot be defended by fortifications, owing to its great breadth.

New Bedford and Fairhaven harbor.—No survey has been made of this harbor, which covers two of the most flourishing towns. It is certainly defensible, and probably for the amount assumed by the engineer department, namely, $300,000.

Narraganset bay.—The properties of this great roadstead will be here adverted to very briefly; more minute information may be obtained by reference to reports of 1820 and 1821.

It is the only harbor on the coast accessible with a northwest wind, which is the most common and violent of the most inclement season; and as winds from N.NW. to S.SW. round by the east serve for entering both Boston and New York harbors, while this harbor can be entered with all winds from northwest to east round by the west, it follows that, while we possess this harbor, vessels may be certain of making shelter on this part of the coast with any wind that can blow, excepting only between N.NW. and NW. From this station the navigation of Long Island sound, and especially the communication between that sound and Buzzard's bay or Martha's vineyard sound, may be well protected. The blockade of the excellent harbor and naval station of New London will be rendered difficult. From this station the navy will command southwardly, as from Hampton roads northwardly, the great inward curve of the coast between Cape Cod and Cape Hatteras; the influence of which command over the blockading operations of an enemy will be apparent, when it is considered that the only harbors of refuge he can have will be the Delaware, Gardiner's, and Buzzard's bays, and that it is far from certain that improvements in the auxiliaries of fortifications may not deprive him of these also.

If Narraganset bay were without defence, an enemy would occupy it without difficulty, and, by the aid of naval superiority, form a lodgement in Rhode Island for the war. Occupying the island alone, or connecting therewith the position of Tiverton Heights, opposite the northern extremity of the island, a position which is of narrow front, easy to secure, and impossible to turn, he might defy all the forces of the eastern States, drive the United States to vast expense of blood and treasure, and while this position of his troops would keep in alarm and motion all the population of the east, feigned expeditions against New York, through Long Island sound, or against more southern cities, would equally alarm the country in that direction; and thus, although he might do no more than menace, it is difficult to estimate the embarrassment and expense into which he would drive the government.

Of old forts, some of which were never finished, Fort Wolcott and Fort Green are the only ones retained in the projected system of defence.

The project of defence proposed by the board of engineers contemplates for the middle channel, on Brenton's Point, a strong fort, (now well advanced,) with outworks; another strong fort and outworks on the Dumplings; a smaller fort on Rose island, and the repair and modification of Fort Wolcott and Fort Green. The eastern passage is already shut by the permanent bridge at Howland's Ferry. As to the western passage, three modes present themselves: 1st, reducing the depth of water by an artificial ledge, so as, while the passage shall be as free as now for merchant vessels, to prevent the passage of ships-of-war; 2d, relying on fortifications alone to close the channel; or, 3d, resorting in part to one and in part to the other mode just mentioned. Being the least expensive and most certain, the estimate was founded on the first.

The total cost of the Narraganset defences are estimated at $2,050,000.

Gardiner's bay.—This most valuable harbor to an enemy investing this part of the coast is probably not defensible by fortifications alone. It has not been surveyed, however, and at no distant day it will be an interesting question, whether by steam batteries, or some similar means, under the protection of and aided by fortifications, its defence may not be accomplished. The necessity for fortifying this bay will be more evident, should the railroad through Long Island, in contemplation, (perhaps in progress,) be constructed.

The engineer department has assumed the probable cost of the works at $400,000.

Sag Harbor, New York, and Stonington, Connecticut.—Neither of these have

been surveyed with reference to defence. The first is possessed of a considerable tonnage; and the second, besides being largely engaged in commerce, is about to be the termination of a railroad from Boston. $100,000 may be assigned to the first, and $200,000 to the other.

New London harbor is very important to the commerce of Long Island sound; and as a port of easy access, having great depth of water, very rarely freezing, and being easily defended, it is an excellent station for the navy. It is also valuable as a shelter for vessels bound out or home, and desirous of avoiding a blockading squadron off Sandy Hook. In the plan of defence, the present Forts Trumbull and Griswold give place to more efficient works, whereof the expense is estimated at $314,515.

Mouth of Connecticut river.—This river has been shown to be subject to the expeditions of an enemy. It has not been surveyed in order to determine on the mode of defending it; and $100,000 is introduced here as the conjectural cost.

New Haven harbor.—It is proposed to defend this harbor by improving and enlarging Fort Hale, and substituting a new work for the slight redoubt erected during the last war, called Fort Wooster. The expense of both may be stated at $90,000.

There are several towns between New Haven and New York, on both sides of the sound; none of them are very large as yet, though most, if not all, are prosperous and rapidly increasing. Although, in their present condition, considering their local situation, it might not be deemed necessary to apply any money to permanent defences, yet, as part of the present object is to ascertain, as near as may be, the ultimate cost of completely fortifying the coast, it seems proper to look forward to the time, perhaps not remote, when some of these towns may become objects of considerable predatory enterprise. Bearing in mind the increase of population in the mean time, and the manner in which the places generally are situated, it is thought that $200,000 will be enough to defend them all.

New York harbor.—The object, of the projected works for the vicinity of New York are to cover the city against an attack by land or sea; to protect its numerous shipping; to prevent, as much as possible, the blockade of this great port, which will have progressively added to the immense wealth of its own rivers, greater and greater amounts of the productions of the boundless regions on the lakes; and to cover the interior communication uniting the Raritan with the Delaware. In the present condition of the defences of this harbor an enemy would encounter no great opposition, whether his attack was made by land or water. Coming by the sound, he might land within ten miles of the city, upon the main, upon Long Island, or upon both; and, coming into the lower harbor, he might, while the works on Staten Island are in their present condition, risk forcing the passage of the Narrows, as well as the upper works, anchoring in the Hudson or in the East river; or he might land in Gravesend bay, eight miles from the city, and march directly to Brooklyn, where he would find the navy yard lying at his mercy, and whence he might levy a contribution or destroy half the city. The only mode of resistance would be the expensive, harassing, and uncertain one of arraying a large body of militia upon Harlaem and Brooklyn Heights, and this could be resorted to only in the event, by no means certain, of receiving timely intelligence of his design.

If we fortify *Throg's Neck* and *Wilkin's Point*, on the East river, and if we complete the works at the Narrows, making them all too strong to be carried by a *coup de main*, we shall secure the means of transferring the neighboring militia upon the flanks and rear of an enemy should he march upon Brooklyn; while we shall secure the same advantage should he pursue the

route by Harlaem, besides increasing the length of his march to twenty miles through an intersected country.

This arrangement of defensive works, necessary as it is, still leaves the lower harbor open to an enemy's vessels; in which harbor, safe at all seasons, he could enforce the strictest blockade; cut off the lines of interior communication by the Raritan, and avail himself at any moment of a landing place in dangerous proximity to the city and navy yard. In view of these considerations, the board of engineers projected additional works: one for the East Bank, and another for the Middle Ground, which would perfect the defences of the harbor; compelling an enemy attacking on this side to land upon a dangerous coast, near thirty miles from his object, and to enforce his blockade by riding on the open sea, with a dangerous coast on either hand. Before determining on the works last mentioned, the board went into much research in order to ascertain whether the sand banks mentioned were unchangeable; and it was thought to have been very fully proved that there had been no material change in more than sixty years. This apparent stability of the shoals encouraged them to devise the projects referred to.

Recent surveys, it has been said, have discovered a new channel. If this be so, it may not be prudent to resort to the project, and it may become necessary to devise other means; but whatever they may be, they must, from the nature of the case, be very expensive; and there will be no great error, probably, in taking the estimated cost of the projected batteries as the cost of such mode of defence as may be finally resolved on. The cost of the complete defence of New York remaining to be incurred is, according to the estimates, $5,369,824.

Delaware bay and city of Philadelphia.—The coast, from the mouth of the Hudson to the Chesapeake, as well as that on the south side of Long Island, is low, sandy, covered by numerous sandy islands lying near and parallel to the coast, and having, besides the Delaware, many inlets and interior basins, but none, excepting the one named, affording water enough for sea-going vessels. The Delaware bay itself, being wide and full of shoals, having an intricate channel, and being much obstructed by ice at certain seasons, affords no very good natural harbor within a reasonable distance of the sea. The artificial harbor now in course of construction near Cape Henlopen will, it is hoped, fully realize the expectations of its projectors, in which event it must be securely fortified. No plans have, however, as yet been made with that object; and as to the probable cost, nothing better can now be done than to assume the conjectural estimate of the engineer department, namely, $600,000.

The lowest point at which Philadelphia is defensible is at Pea Patch island, about forty-five miles below that city. A fort on that island, to replace the one destroyed by fire; a fort opposite the Pea Patch, on the Delaware shore; a temporary work on the Jersey shore, to be thrown up at the commencement of war. and floating obstructions placed in the channel, under the fire of these works, will effectually cover Philadelphia, the other important places on the river, and the outlet of the canal connecting the Delaware and Chesapeake bays. The plans and estimates for a fort to replace Fort Delaware are not completed. Taking the expense thereof at $600,000, the expense of the system, inclusive of temporary works, will be $1,121,000.

Chesapeake bay.—The board of naval officers and engineers intrusted with the selection of sites for great northern and southern naval depots, recommended, in their joint reports of 1819 and 1820, Burwell's bay, on James river, for the one, and Charlestown, near Boston, for the other. They also recommended Boston harbor and Narraganset bay, at the north, and Hampton roads, at the south, as chief naval rendezvous. In those reports the commission entered at at large into the consideration of all the matters of these important objects; and reference is now made to those reports for many very interesting details.

Hampton roads, James river, and Norfolk.—The works projected for the defence of these are, 1st, a fort and advanced lunette at Old Point Comfort; 2d,

a casemated battery on the Rip Rap shoals; and 3d, a line of floating obstructions extending across the channel, between these works. In the event of a great naval depot being fixed on James river, it might ultimately be desirable to provide additional strength, by adding works on the positions of Newport's News, Nasaway shoals, and Craney Island flats. Exclusive of these, the cost of completing the works is estimated at $723,188.

The existing fort, viz: Fort Norfolk, will aid in the defence of the city of Norfolk and of the navy yard. It is a small and inefficient work, but may be made useful as an accessory to the general defensive operations.

Harbor of St. Mary's.—The central situation, as regards the Chesapeake, of this fine basin; its relation to the Potomac; its depth of water, and the facility with which it may be defended, indicates its fitness as a harbor of refuge for the commerce of the bay, and as an occasional if not constant station during war, for a portion of the naval force. A survey has been made, but no projects have been formed. The engineer department has conjectured that the cost may be $300,000.

Patuxent river.—The more effectually to protect the city of Washington from a sudden attack by troops landed at the head of navigation of the Patuxent, and to provide an additional shelter for vessels, a fort has been planned to occupy Point Patience, and another to occupy Thomas's Point, both about six miles from the Chesapeake. Their expense will be $505,000.

Annapolis harbor.—No surveys or plans of defence have been made. The existing works are very inefficient. The estimate made by the engineer department, viz: $250,000, is adopted.

Harbor of Baltimore.—The proximity of Baltimore to the bay places that city in a dangerous situation. In the present state of things, an enemy, in a few hours' march, after an easy landing, without being exposed to a separation from his fleet, can make himself master of that great commercial emporium.

Baltimore requires for its security two forts in the Patapsco: one at Hawkin's Point, and the other at the extreme end of the flat, off Sollers's Point. Besides the advantages which will result of obliging the enemy to land at a greater distance, thereby delaying his march, gaining time for the arrival of militia, and preventing his turning the defensive positions our troops might occupy, it will be impossible for him to endanger the city or its shipping by a direct attack by water. The present Fort McHenry, Redoubt Wood, and Covington battery, should be retained as a second barrier. Allowing $150,000 for putting these in a more efficient state, the expense will be $1,517,000.

Mouth of Elk river.—The completion of the line of communication from the Delaware to the waters of the Chesapeake makes it necessary to place a fort somewhere near the mouth of the Elk, in order to prevent an enemy from destroying, by a sudden enterprise, the works connecting these communications with the river. There have been no surveys made with a view to establish such protection, but the engineer department estimates the cost of a suitable fort at $300,000.

City of Washington, Georgetown, and Alexandria.—Fort Washington covers these cities from any attack by water, and will oblige an enemy to land at some fifteen or eighteen miles from Alexandria, should that city be his object. It will also serve the very important purpose of covering the troops crossing from Virginia, with a view to fall on the flanks of an enemy moving against the capital. All these objects would have been better fulfilled had the work been placed at lower Cedar Point. As it is, however, the forts in the Patuxent being constructed, and the militia of the surrounding country in a due state of preparation, an enterprise against these cities would be one of great hazard. Still, a work on Cedar Point should on no account be omitted. The department estimates its cost at $300,000.

From the mouth of the Chesapeake to Cape Hatteras there occurs no inlet navigable by sea-going vessels.

SOUTHERN SECTION OF THE ATLANTIC COAST.

This coast is invariably low, and, for the greater part, sandy, much resembling the coast from Cape Hatteras to Montaug Point. A ridge of sand, here and there interrupted by the alluvion of the rivers, extends through its whole length; this ridge, in certain portions, lies on the main land, while in others it is divided therefrom by basins or sounds of various width and depth, and is cut up into islands by numerous channels of greater or less depth, connecting these interior waters with the sea. Wherever this sand ridge is broken, its place is occupied by low and marshy grounds, bordering the principal and the many lesser outlets of the rivers.

The nature of the country through which the rivers of this coast flow, after leaving the mountains, is such that the banks being easily abraded by the current, the waters are always turbid, and are continually transporting new supplies for the formation of alluvion and the maintenance of extensive submarine banks, shoals, and bars; that these do not rapidly increase is owing to the force of the current, the action of the sea, and the mobility of the particles of matter. It is to the same cause, namely, the wearing away of the shores of the rivers, that is to be attributed the want, on this coast, of harbors unobstructed by bars, and which, as a coast, particularly distinguish this and the Gulf of Mexico frontier (where similar operations have been going on) from the more northern and eastern portions.

Ocracock inlet.—The shallowness of the water on the bars at Ocracock effectually excludes all vessels-of-war from the harbor within. But as this is now an outlet of an extensive commerce, and through this opening attempts might be made in small vessels, or in boats, to interrupt the line of interior communication, whereon so much might depend in time of war, timely preparation must be made of temporary works equal to defence of it against all such minor enterprises.

Beaufort harbor, North Carolina.—Work completed.

Mouth of Cape Fear river.—The defence of the main channel of Cape Fear river requires, in addition to the work nearly completed on Oak island, another fort on Baldhead, and the defence of the smaller channel will require a redoubt on Federal Point. The battery, magazine, block-house, quarters, &c., at Smithville, should remain as accessories. The cost is set down at $258,000.

Georgetown harbor.—The first inlet of any consequence south of Cape Fear river is at the united mouths of the Waccamaw, Pedee, and Black rivers, forming Georgetown harbor, which is a commodious and capacious bay, having sufficient water within and upon the bar, near the mouth, for merchant vessels and small vessels-of-war. A survey of this harbor, begun many years ago, has never been completed, and no projects of defence have been made. It is probable that a work placed near Moscheto creek or on Winyaw Point would give adequate strength, at the cost of about $250,000.

Santee river and Bull's bay.—About ten miles south from Georgetown entrance are the mouths of the Santee, the largest river in South Carolina. It is not known whether the bars at the mouths of this river have sufficient water for sea-going vessels; the same uncertainty exists as to the depth into Bull's bay. It may be well, however, to consider them, and the other inlets between Georgetown and Charleston, as calling for small works capable of resisting boat enterprises, and to assign to them $100,000. Should they prove to be navigable for privateers they will need a larger expenditure.

Charleston, South Carolina.—The city, situated at the junction of Ashley and Cooper rivers, is about five miles, in a direct line, from the sea. Between

it and the ocean is a wide and safe roadstead for vessels of any draught. Upon the bar, lying three or four miles outside of the harbor, there is, however, only water enough for the smaller frigates and for large sloops-of-war. On the southwest side of the harbor is James's island, through which are several serpentine passages, more or less navigable for boats and barges; some of them communicate directly with the sea and Stono river. Whappoo cut, the most northerly passage from Stono to Charleston harbor, enters Ashley river opposite the middle of the city. Interior natural water communications exist also to the southwest of Stono river, connecting this with North Edisto river, the latter with South Edisto and St. Helena's sound; this again with Broad river, and, finally, this last with Savannah river. On the north side of the harbor of Charleston lies Sullivan's island, separated from the main by a channel navigable to small craft. To the northeast of Sullivan's island an interior water communication extends to Bull's bay, and even beyond, to the harbor of Georgetown.

From this sketch, it is apparent that it will not do to restrict the defences to the principal entrance to the harbor. The lateral avenues must also be shut. And it is probable that accurate surveys of all these avenues will show that the best mode of defending the latter will be by works at or near the mouths of the inlets, as the enemy will be kept thereby at a greater distance from the city; the lesser harbors formed by these inlets will be secured, and the line of interior communication will be inaccessible from the sea.

No position for the defence of the principal entrance to Charleston harbor can be found nearer to the ocean than the western extremity of Sullivan's island. This is at present occupied by Fort Moultrie, a work of some strength, but by no means adequate to its object, its battery being weak, and the scarp so low as to oppose no serious obstacle to escalade. How far this work, by modification of its plan and relief, may be made to contribute to a better defence of the harbor, cannot now be determined.

On a shoal nearly opposite Fort Moultrie the foundation of a fort has been begun, which will have a powerful cross-fire with Fort Moultrie. It is presumed that about $800,000 would put these works in a complete state.

Stono, North Edisto, and South Edisto.—All these must be fortified, at least in such a manner as to secure them from enterprises in boats or small vessels. To that end $50,000 may be assigned to each.

St. Helena sound.—The proper defences cannot be pointed out till this sound shall have been surveyed.

Although there is supposed to be no great depth of water on the bar, it is known to be navigable by the smaller class of merchantmen, and to have a navigable communication with the head of Broad river, or Port Royal, intersecting the interior navigation between Charleston and Savannah. This sound will require defence, even should it not be of much use as a harbor of refuge for exterior commerce. $150,000 may be the cost of the defences.

Broad River or Port Royal roads.—The value of this capacious roadstead, as a harbor of refuge, depends on the depth which can be carried over the bar, on the distance of this bar outside of the line of coast, and on the means which may be applicable of lessening the danger of crossing it. This is supposed to be the deepest bar of the southern coast. Should there prove to be water enough for frigates, and by light-houses on the shore, and lights, or other distinct guides, on the bar, should it be practicable to make the passage of the bar safe and easy, this road, situated within sixty miles of Charleston and twenty of Savannah river, intersecting the interior navigation between these great cities, thereby securing the arrival of supplies of every kind, would possess a very high degree of importance, not only as a harbor of refuge, but as a naval station also.

The survey of the exterior shoals, constituting the bar, should be made with the greatest care, and all possible minuteness. It is only when this shall have

been done that the true relation of this inlet to the rest of the coast can be known and on this relation the position and magnitude of the required defences will depend. For the present, the estimate made by the engineer department is adopted, namely, $300,000.

Savannah and mouth of Savannah river.—Mention has been made of the natural interior water communication along the coast of South Carolina. A similar communication extends south from the Savannah river, as far as St. John's, in East Florida. Owing to these passages, the city of Savannah, like Charleston, is liable to be approached by other avenues than the harbor or river; and its defences must consequently have relation to these lesser as well as the principal channels.

The distance from the mouth of Wassaw sound, or even Ossabaw sound, (both to the southwest of Savannah river,) to the city, is not much greater than from the mouth of the river; and an enterprise may be conducted the whole distance by water, or part of the way by water and part by land, from either or both. As in the case of like channels in the neighborhood of Charleston, it cannot now be determined where they can be defended most advantageously. It is to be hoped, however, that the localities will permit the defences to be placed near the outlets of the sounds; because the defences thus placed will serve the double purpose of guarding the city of Savannah and covering these harbors, which, in time of war, cannot but be very useful.

The defence of Savannah river is by no means difficult. A fort on Cockspur island, lying just within the mouth, and perhaps, for additional security, another on Tybee island, which forms the southern cape at the junction of the river with the ocean, would effectually prevent the passage of vessels up the channel, and cover the anchorage lying between Tybee and Cockspur. The existing Fort Jackson, standing about four miles below the city, should be maintained as a second barrier, both as respects the main channel and the passages which come into the river from the south; which last would not at all be controlled by works on Cockspur or Tybee. A fort projected for Cockspur island is estimated at $470,000. To defend Tybee island may require $150,000, and $50,000 would put Fort Jackson in an efficient state, making a total of $670,000. South of the Savannah are *Wassaw sound, Ossabaw sound, St. Catharine's sound,* at the mouth of the Medway river; *Sapelo sound, Doby inlet, Altamaha sound,* at the mouth of the great river of the same name; *St. Simond's sound,* at the mouth of Buffalo creek; *St. Andrew's sound,* at the united mouths of the Scilla and Santilla rivers; and *Cumberland sound,* at the mouth of the St. Mary's river. All these communications with the ocean are highly important, as regards the line of interior navigation, and several of them as affording access to excellent harbors. The last, especially, is known to be navigable by the largest sloops-of-war and merchantmen; and two or three of the others are believed to be but little, if at all inferior, either as regards depth of bar or safety of anchorage.

All these inlets are yet to be surveyed. Some of them are probably easily defensible by forts, and others may require the aid of floating defences. An important principle in relation to the defensive system of the whole southern coast, namely, that, on a coast possessing a few harbors, it is at the same time the more necessary to preserve them all for our own use, and the more easy to deprive an enemy of that shelter which is nearly indispensable to a continuous and close blockade. This principle is enforced as touching this particular part of the southern coast by the two following weighty considerations: its remoteness from the nearest naval rendezvous, the Chesapeake, which is on a mean 600 miles distant, and to leeward, both as to wind and current; and its being close upon the larboard hand, as they enter the Atlantic, of the great concourse of vessels passing at all seasons through the Florida channel.

While, therefore, this part of the coast from the concentration of vessels here is in great need of protection of some sort, naval aid can be extended to it only

with difficulty, and at the risk of being cut off from all retreat by a superior enemy.

Accurate and minute surveys which will enable our vessels, whether driven by an enemy or by stress of weather, to shun the dangers which beset the navigation of these harbors, and properly arranged defences to cover them when arrived, seem to be indispensable. It is worthy of remark, besides, that when these harbors shall be fortified the operation of investing the coast and watching the great outlet of commerce through Florida passage will be a difficult and hazardous one to an enemy, on whose part no perseverance or skill can avail to maintain an uninterrupted blockade, or to avoid the occasional shipwreck of his cruisers; while on the part of our small vessels-of-war and privateers the same sort of supervision will at all times be easy and safe.

Nothing better can be now done than to assume $200,000 as the average cost of defending each of the nine entrances, giving a total of $1,800,000.

The board of engineers have not examined the coast from the mouth of the St. Mary's to Pensacola, but in order that the chain of defence for the coast may be here exhibited unbroken, the estimates of the engineer department for the places and positions intermediate between Cumberland sound and Pensacola will be inserted. St. Augustine, $50,000; Key West and Tortugas, $3,000,000; Charlotte harbor, Espiritu Santa bay, Apalachicola, Apalache bay, St. Joseph's bay, St. Rosa bay, together, $1,000,000.

GULF OF MEXICO FRONTIER.

The resemblance of this part of the coast to that which we have denominated the southern section is striking. We may, indeed, refer to the description herein given of the principal features of the latter as a true delineation of this. In respect to the relation of the coast to the interior, there is, however, the greatest difference between these two portions of the maritime frontier; for while about eight-tenths of the whole territory of the United States is in one sense tributary to a part only of the Gulf of Mexico portion, in the southern section of the coast not more than one-tenth is connected with the seaboard by any natural ties. This fact, which shows the very deep interest which a large portion of the people and the government have in the security of this portion, is related to other facts which hardly leave an alternative as to the mode of attaining that security.

From the relative geographical position of this part of the coast, and the country interested in its safety; from the unhealthiness of the climate, nature of the adjacent country, and mixed character of the inhabitants, it will be some time before that portion, within supporting distance, whose welfare may be endangered by an enemy will, from peculiar circumstances, be competent of itself to sustain the assaults of an exterior foe. Upon the Atlantic seaboard the Alleghanies crowd the people upon the coast, and surround every alarm post of the frontier with a more and more dense population; and the ocean and the interior parallel communication transmit rapid aid to the right and left, while the coast of the Gulf, weak in itself and remote from succor from behind, is almost inaccessible to lateral assistance.

Those reasons, therefore, which tend to establish the necessity of an organized, a permanent, and a timely system of defence for the whole seaboard of the United States (some of which were advanced in the commencement of this communication) will apply to this part of it with a peculiar force so long as any portion of its system of defence is incomplete.

It has already been observed that the board of engineers have made no examination between Cumberland sound, in Georgia, and Pensacola. There are, however, along that shore and in the Florida reef several very important harbors which must be accurately surveyed.

Pensacola bay.—The upper arms of this considerable bay receive the Yellow-water or Pea river, Middle river, and Escambia river; and while the tributaries of the last, interlocking with branches of the Alabama and the Chattahoochie, seem to mark the courses whereby, at some future day, canals will convey a part of the products of these rivers to Pensacola, the face of the whole region is remarkably adapted to the application of railroads.

Santa Rosa sound extends eastward from the lower part of this bay into Santa Rosa bay. On the west the lagoons of Pensacola, Perdido, and Mobile bays, respectively, interlock in such a manner as to require but a few miles of cutting to complete a navigable channel from the first to the last-named bay, and thence through an existing interior water communication to the city of New Orleans.

Pensacola bay has rare properties as a harbor. It is accessible to the largest class of sloops-of-war and to small frigates, and under favorable circumstances will admit even large frigates; and there is reason to hope that the bar may be permanently deepened.

The bar is near the coast, and the channel through it is straight and easily hit.

The harbor is perfectly land-locked, and the roadstead very capacious. There are excellent positions within it for repairing, building, and launching vessels, and for docks and dock-yards, in healthy situations. The supply of good water is abundant. It is perfectly defensible. These properties, in connexion with the position of the harbor as regards the coast, have induced the government to fix upon it as a naval station and place of rendezvous and repairs.

An excellent survey has been made of the bay of Pensacola, sufficing to form the scheme of defence, while no other objects were sought than the security of the town and harbor. Regarded, however, as a naval station and place of rendezvous and repairs, further surveys, extending a greater distance from the shores, delineating accurately the face of the country and showing the several avenues by land and water are found to be necessary.

The defences of the water passage, as projected, are nearly completed, $210,000 being asked to finish them. A further water defence at the position of the Barrancas, and the works that are indispensable to cover the navy yard from a lateral attack through the western bays—the latter requiring the further surveys above mentioned—are not yet planned. The Barrancas work may be taken at $100,000, and the others at $300,000, making a total for Pensacola of $610,000.

Perdido bay.—This bay is intimately related to Pensacola and to Mobile bays, both as regards security and intercommunication, and should be carefully surveyed, with a view to these objects. It must be fortified, and the cost may be $200,000.

Mobile bay.—The plan of defence for this bay comprised a fort at Mobile Point, which has been finished; another on Dauphin island, and a tower at the Pass au Heron. The estimates for the two last named amount to $905,000.

New Orleans and the delta of the Mississippi.—The most northern water communication between the Mississippi and the Gulf is by the passage called the Rigolets, connecting Lake Borgne and Lake Pontchartrain. The next is by the pass of Chef Menteur, also connecting these lakes. Through these passages an enemy entering Lake Pontchartrain would, at the same time that he intercepted all water communication with Mobile and Pensacola, be able to reach New Orleans from the southern shore of the lake, or might continue onward through Lake Maurepas, Amite river, and Iberville river, thereby reaching the Mississippi at the head of the delta; or, landing within the mouths of Chef Menteur, he might move against the city along the ridge of the Gentilly road.

To the southwest of Chef Menteur, and at the head of Lake Borgne, is Bayou Bienvenu, a navigable channel, (the one pursued by the English army in the last war,) not running into the Mississippi, but possessing shores of such a nature as to enable troops to march from the point of debarkation to the city. A little

to the south of this is Bayou Dupre, also affording easy access to the city. The avenues just named are defended by a fort at the Rigolets; another at Chef Menteur; another at Bayou Bienvenu, and a tower at Bayou Dupre.

The defences of the river are placed at the Plaquemine turn, the lowest position which can be occupied. Fort Jackson is on the right shore, and Fort St. Philip a little lower down, on the left: this last work must be repaired or renewed. The expense is estimated at $117,000.

The only permanent work required at present, west of the Mississippi, is a fort to occupy Grand Terre island, for the purpose of defending the entrance to Barrataria bay, an excellent harbor for a floating force guarding the coasting trade on that side, and whence there are several passages leading to the Mississippi, near New Orleans. The estimate for this work is $400,000.

Before leaving this part of the subject, it is necessary to advert to the important uses which may be made of movable floating defences in aid of fortifications.

The applications of this auxiliary force along the coast of the United States may be very numerous, and, as has been before remarked, would, in certain cases, be requisite to attain full security for all the objects needing protection. In the case we have just been considering, for example, fortifications will enable us to protect New Orleans, even from the most serious and determined efforts of an enemy; but, owing to the great width of the passages, we cannot, by fortifications alone, deprive an enemy of good exterior anchorages, especially the very excellent one west of Chandeleur island, nor entirely cover the interior water communications between the Rigolets and Mobile. We must, therefore, either quietly submit to all the annoyance and injury which an enemy in possession of these passages may inflict, or avert them by the timely preparation of a floating force, adapted to their peculiar navigation, and capable, under the favorable shelter of the forts, of being always on the alert, and of assuming an offensive or defensive attitude, according to the designs, conduct, or situation of the enemy. As these means of defence are, however, secondary to fortifications, in every sense; as the extent to which they may be needed must depend on the relation of our naval force to that of other powers—a relation continually varying as the shapes which these auxiliaries are to assume—the materials of which they are to be formed, the weapons they are to use, the agent which is to give them power, are points on which every ten years of this age of rapid improvement in the arts may effect complete revolutions, it is considered premature to go into details, and premature to go into expense.

From the preceding sketch of the system projected for the defence of the seaboard of the United States, it appears that all the fortifications proposed are not of the same pressing necessity, nor of like importance. Some are required immediately, while the commencement of others may be postponed. In proceeding to class them, it must be observed that the works of the first class are those destined to prevent an enemy from forming a permanent or even a momentary establishment in the country, those which will defend the great naval arsenals, and those which will cover the chief cities and towns.

In the second class will be placed the works which are to defend those naval stations and those cities of a secondary rank, which, either from natural or artificial defences, existing works, &c., are not entirely without protection, and may, therefore, wait until the more important points are secured against a first attack; and in the third class will we arrayed the works which complete the defensive system in all its parts, but of which the construction may, without great danger, be deferred until the frontier shall have received all the successive degrees of strength resulting from a gradual erection of the forts of the first and second classes. A fourth class is added, containing such works as will be necessary only conditionally.

Table A, joined to this report, contains the first class, and shows that the

works of this class will cost $11,609,444; will require 2,585 men to garrison them in time of peace, and 30,966 in case of siege.

Table B contains the works of the second class, showing that they will cost $5,873,000; will require 975 men to garrison them in time of peace, and 10,680 in case of siege.

Table C contains works belonging to the third class, showing that their cost will be $14,078,824; that their garrisons in time of peace will amount to 2,380 men, and in time of siege to 21,745 men; showing, also, that the total future expense of fortifying the maritime frontier will amount to $31,561,268; the troops necessary to guard these fortifications in time of peace to 5,940 men, and 63,391 men in time of war, supposing them all (which cannot happen) besieged at once.

The time required to construct the whole system must depend upon the annual appropriation which the nation may grant to this branch of the public service. All that need be said on the subject is, that in an undertaking necessarily involving so much time, and of such vital importance to the safety, prosperity, and greatness of the Union, there should be no relaxation of effort and perseverance. An undertaking of such magnitude must, with every effort, be the work of years. But it may be too much hurried as well as too much delayed. There is a rate of progress at which it will be executed in the best manner and at the minimum cost. If more hurried, it will be defective in quality and more costly if delayed.

France was, at least, fifty years completing her maritime and interior defences.

Some remarks will now be offered on the subject of the expense of erecting a system of defensive works, and garrisoning them for war, comparing it with the expense of defending the coast without fortifications. To simplify the proposition, the defence of Portsmouth, Boston, Narraganset roads, New York, Philadelphia, Baltimore, Norfolk, Charleston, Savannah, and New Orleans, only, will be taken.

Supposing an enemy had concentrated 20,000 men at Halifax or Bermuda; the government must, on hearing of this force, at once prepare to resist it at all the points mentioned above As it will be impossible to foresee on which the first blow will be struck, it will be necessary to have troops encamped at each; and to meet the attack with a force not less numerically than that of the assailant, the troops kept constantly under arms must, at least, equal one-half of the hostile expedition, while as many more, ready for instant service, must be within call. These points are so immediately accessible in some cases, and so remote from succor in others, that, after the point of attack is announced by the appearance of the enemy before it, there will be no time for re-enforcements to come from the interior.

By manœuvring in front of any of these places the enemy would induce us to concentrate forces there; when, suddenly profiting of a favorable breeze, he would sail to another, which he would reach in a few hours, and would not fail to seize if a force were not stationed there likewise, at least, equal to his own. No re-enforcement can, in this case, arrive from the interior in time, for all the troops under march would have taken up a direction upon the point he has just quitted.

Our whole coast from Maine to Louisiana would thus be kept in alarm by a single expedition; and such is the extent and exposure of the seaboard that an enemy might ruin us by a war of mere threatenings. If the cities and other great establishments are not garrisoned, they will become a prey at once; and if they are garrisoned, the treasury will be gradually emptied; the credit of the government exhausted; the weary and starving militia will desert to their homes; nor will it be easy to avert the consummation of tribute, pillage, and conflagration.

The table E, joined to this report, shows that, to be in readiness on each of these vulnerable points, it will be requisite to maintain 107,000 men encamped

and under arms at the ten places mentioned, and 93,000 men ready to march and within call.

This number is, in fact, below that which would be required; for these points being, according to our hypothesis, exposed to an attack from 20,000 regular and disciplined troops, 20,000 militia would not be able to repel them unless aided by entrenchments, requiring a time to construct them, which might not be allowed, and involving expenses which are not included in the estimate. Besides, to have 20,000 men, especially new levies, under arms, it will be necessary, considering the epidemics that always assail such troops, to carry the formation of these corps to at least 25,000 men.

The State of Louisiana, being remote from succor, requires a larger force under arms than the other points; this force is fixed at 17,000, supposing that the State may supply 3,000 within call.

All expenses being reckoned, 1,000 regular troops, including officers, cost $300,000 per annum, or $150 per man, for a campaign of six months. 1,000 militia, including officers, cost $400,000 per annum, or $200 per man, for a six months' campaign. But, taking into consideration the diseases which invariably attack men unaccustomed to military life, and the consequent expense of hospital establishments; the frequent movement of detachments from the camp to their homes, and from the interior to the camp; and the cost of camping furniture, utensils, accoutrements, &c., which is the same for a short campaign as for a year; regarding all these things, the cost of militiamen cannot be reckoned at less than $250 per man for six months.

The 107,000 militiamen necessary to guard the above-mentioned points, the maritime frontier being without defence, will therefore cost, in a campaign of six months, $26,750,000. In strict justice there should be added to this expense, which is believed to be much understated, amongst other things, the loss of time, and the diminution of valuable products resulting from drawing off so considerable a portion of efficient labor from its most profitable pursuits. This, besides being a heavy tax on individuals, is a real loss to the nation.

It would be utterly vain to attempt an estimate of the loss to the nation from the dreadful mortality which rages in the camps of men suddenly exposed to the fatigues and privations of a military life.

The total expense of constructing the fortifications at the ten places before mentioned will amount to $21,767,656.—(See table E.)

The garrisons of these fortifications may consist of the same number of regular troops in time of war as in time of peace; the remainder being furnished by the militia held in readiness to throw themselves into the forts on the first appearance of an enemy. By this arrangement 3,010 regulars and 32,076 militia, either within the works or in small corps on advantageous positions, making in all 35,086 men, would suffice; 64,914 men being kept in readiness to march when called upon.

We should, therefore, have only 35,086 to pay and support instead of 107,000, and the expense would be $8,430,500 instead of $26,750,000. The difference, namely, $18,319,500, being only $3,448,156 less than the whole cost of these defences. It follows that the expense of their erection would be nearly compensated by the saving they would cause in a single campaign of six months.

It is proper to add that, although the expense of these works will be great, that expense is never to be renewed; while with troops, on the contrary, the expense is annually repeated, if not increased, until the end of the war. Besides, the disbursements for fortifications are made in time of peace, slowly and to an extent exactly correspondent with the financial resources of the country. Armies are most wanted, and must be paid, in periods of the greatest emergency, when the ordinary sources of revenue are dried up, and when the treasury can only be supplied by a resort to means the most burdensome and disagreeable to the people.

The defence of the maritime frontier by permanent fortifications, and the disbursements for their construction, will thus tend to a real and positive economy.

The vulnerable points being reduced to a small number, instead of waiting an attack on every point, and holding ourselves everywhere in readiness to repel it, we shall force an enemy to direct his assaults against those few which, being well understood by us, will, of course, have received timely preparation. There can be no doubt that such a state of things will make an adversary more reluctant to risk his expeditions; and, therefore, that we shall not only be better able to resist, but also less frequently called on to do so.

Some prominent military writers have opposed the principle of fortifying an extensive land frontier, but none have ever disputed the necessity of fortifying a maritime border; the practice of every nation, ancient and modern, has been the same in this respect. On a land frontier a good, experienced, and numerous infantry may, in some cases, dispense with fortifications, but though disciplined troops may cover a frontier without the aid of fortifications, undisciplined troops cannot. On a maritime frontier, however, no description of troops can supply the place of strong batteries disposed upon the vulnerable points. The uncertainty of the point on which an enemy may direct his attack, the suddenness with which he may reach it, and the powerful masses which he can concentrate at a distance out of our reach and knowledge, or suddenly, and at the very moment of attack require that every important post be prepared to repel his attempt, or retard it until re-enforcements can arrive and adequate means of resistance be organized. By land we are acquainted with the motions of an enemy, but the ocean is a vast plain, without obstacle, where his movements are made out of our sight, where no trace is left of his path, and where we know nothing of his approach until he is within reach of the eye. In a word, unless the vulnerable points of a seaboard are covered by fortifications their only chance of safety must depend on the issue of a battle, always uncertain, even when the best disciplined, most experienced, and best appointed troops have made all possible preparation for the combat.

As for the garrisons which these forts will require in time of war, a small portion, about equal in number to the peace garrisons, should be of regular troops, the remainder of militia, practiced in the manœuvres and drill of great guns; it being indispensable that the greatest part of the troops required for the defence and service of the sea-coast fortifications should be of artillery.

This brings us to a suggestion or two in relation to the organization of the militia forces. Instead of the present small proportion of artillery allowed in the militia organization, the States might, with great advantage, increase the proportion of that force in the vicinity of each of the exposed parts of the coast, so as to be equivalent to the exigencies and armament of the works; substituting for the usual field exercises as infantry actual drill and practice in the batteries. The number of militia artillery in each case would be determined by the number of guns applied to the defence of that particular place. As soon as a movement on the part of the enemy should threaten the frontier of the State this force should throw itself into the forts, and there remain so long as the precise point of attack should be undetermined. In most parts of the seaboard it would be advisable to have also a considerable body of militia horse artillery, as being a very useful arm in all cases, and as affording a defence always applicable against minor and predatory enterprises. This force might, in part, be drawn from the ordinary proportion of cavalry.

If, with our general system of permanent fortifications and naval establishments, we connect a system of interior communication by land and water, adapted both to the defence and to the commercial relations of the country; if to these we add a well constituted regular army, and a militia perfect in its organization, the nation will not only secure its territory from invasion and insult, but will

preserve its institutions from those violent shocks and revolutions which have so frequently, in every age and in every country, been incident to a state of war.

Tables A, B, C, and D, following, contain the works constituting the proposed defensive system for the maritime frontier, arranged in four classes.

Table E exhibits a comparison of the cost of defending certain important parts of the coast without fortifications, and with the aid of the projected works.

Table F shows a possible concentration of militia forces in eleven days at Boston, Newport, R. I., New York, Philadelphia, Baltimore, Norfolk, Charleston, S. C., Savannah, Georgia, and New Orleans.

NORTHERN FRONTIER.

Not having been the subject of particular care and study, it is with diffidence that a few words are thrown out on the subject of the defence of the frontier which separates the United States from the English possessions.

The first questions that arise are these: Is the political condition of the country lying on the other side of the country in question, viz: the condition of colonies of a trans-Atlantic power to remain altered? Or are these colonies to become independent nations? Or is any other important change to be wrought in their political relations? These questions bear directly upon the matter in hand. A generation hence and there may be no more room for jealousy and watchfulness along that line than there now is along the imaginary lines which separate our contiguous States. Within the same period the Canadas may have assumed the attitude of independent and separate States; and, although the United States may recognize in these northern neighbors a youth of much promise and vigor, the period when the relative increase shall have been such as to make their proximity a source of much precaution and solicitude will not, probably, be near at hand. But though it may be possible that the colonial relations may be thrown off within the period for which it is our duty now to provide; and although in any other relation the United States might rely for security, at any moment, on the greater power which she might at any moment develop, can it be distinctly foreseen that the existing political connexion is to be soon dissolved? If not, if there be uncertainty on this point, does it become the duty of the United States to proceed at once to the task of securing herself on this frontier, regarding it as separating her from one of the most powerful empires of the earth? Or, finally, may she wait and watch, relying on her sagacity to give due notice of impending danger, and on her resources to supply her, in time, with appropriate armor? If it be, indeed, possible to apply, within a brief state of time, all the defences that can be needed on this frontier, the course last suggested would appear to be the best. What, therefore, is like to be the nature of the danger, and what the nature of the defence?

Along the St. Croix river only local establishments could require to be covered, as there are no objects of consequence to be reached by an enemy penetrating our interior from that border. Then comes the disputed territory and the great unsettled regions along the northern margins of New Hampshire and Vermont.

Upon all this extent of frontier the exact location of future establishments, of consequence, cannot be foreseen with the certainty warranting their being now provided for by permanent defensive works. This region is to become populous and wealthy; the natural means of communication are to be improved, and numerous artificial means of communication are to be opened by roads, canals, and railways; but while this growth in wealth may invite aggression, the growth in numbers, and the increased facilities of intercommunication, the increased power of rendering mutual succor, and of drawing aid from the interior, would, in a still greater degree, make aggression difficult and improbable.

Lake Champlain penetrates the territory in such a way that an enemy, having

the naval mastery, might make a deep inroad and greatly harass the country along the shores, although no enterprise, even in the present state of population, could be carried far into the interior. Were it only to relieve a long line of frontier from predatory incursions, access to this lake from the north should be denied. But there are other very strong reasons for this exclusion. By closing the lake at its northern extremity, an expensive and uncertain strife for naval superiority on this lake would be avoided, and the whole lake would remain in our possession, serving as the best possible military line of communication, in case the United States should assume offensive operations against the weakest point of the Canadian frontier.

From the northern end of this lake the forces of the United States should march into Canada and intercept the communication by the St. Lawrence, either at or near the mouth of the Richelieu river, at Montreal island, at some point where the ship channel of the river could be commanded, intermediate between these places, or at any two or at all these places, according to circumstances. Maintaining any or all these positions would limit the defence in the province above to the consumption of the means then in store, and would completely paralyze its offensive power. Although no other object were in view than the defence of the frontier upon the upper lakes, no effort necessary to secure and maintain this position should be spared, because it is only thus that the contest for naval superiority on the lakes, which, if once suffered to begin, is both exhausting and interminable, can be avoided.

Without aid from abroad, Canada cannot contest such a question with the United States; and, so long as the United States possess that superiority, the defence of the upper portion of the frontier will be complete.

From being the most expensive of all modes of defence, naval superiority in our hands may thus become the cheapest; two or three small armed vessels on each lake, employed as convoys to the ordinary navigation, and to the transports bearing troops and munitions being all that would be needed.

Military enterprises would, in this way, be warded off from the numerous rich and populous cities and towns now embellishing our border, which it would not be easy to protect from the calamities of war by mere military works, without running into great expense, were the enemy's naval means to allow his approaching them at his pleasure.

In the case of the offensive movement supposed above, the fortified position of Isle Aux Noix, and any other upon the Richelieu, should be at first left in rear, being reached or mastered by suitable bodies of troops, and should be subjected to immediate investment and vigorous attack, so as to be speedily reduced, and to open the navigable water communication within twenty miles of Montreal.

If the preceding remarks be well founded, it would appear that the peace and safety of the parts of the frontier extending along the river St. Lawrence, Lakes Ontario, Erie, Huron, and Superior, might be made to flow from military operations carried on against Canada, by the line of Lake Champlain and the river Richelieu; and in order to this military operation being always practical, and to be taken up at pleasure, nothing more is necessary than the fortification of the outlet of Lake Champlain. It might have been before remarked that the offensive movement in question is not deemed to be difficult or hazardous, nor would it be necessarily restricted to holding positions on the St. Lawrence; active operations against Quebec, to which this is the most convenient road, following as a matter of course upon these first successes.

The security, therefore, that may be obtained for the upper frontier by military operations on the lower, may at least justify these upper portions in waiting the progress of events.

The unexampled increase of population upon these very borders, the hundred new ways already finished or in hand, of connecting these borders with the heart of the country, may so elevate the military resources of the region that, in the

event of war, it will matter little in which of the political conditions first supposed the opposite territory may be found—a resistless torrent sweeping it from end to end; and, although it might not be prudent to rely in such a matter on the mere spread of wealth and numbers, we may be certain that there will exist ample resources to create all such artificial military aids as the circumstances may call for, and we may infer that the application of these aids would now be premature.

The military consequences of the occupation of the outlet of Lake Champlain are so obvious that it must not be supposed they are not perfectly understood by our neighbor across the border. As it would consequently be a great object with him to avert the consequences alluded to, he would, in the event of war, (often breaking out suddenly,) be first, if possible, in taking such a position as would prevent our commanding the issue of the lake; and hence it is that, in the preparation of the only permanent military work now recommended for the northern frontier, it seems advisable to admit no unnecessary delay.

A position for closing the lake, selected during the last war, and of which the fortification was begun soon after the peace, was found, after some progress had been made, not to lie within our territory, and was abandoned. There is, however, a position equally good close at hand, and in all respects admirably adapted to the object in view.

The fortification of this outlet will probably cost about $600,000.

All of which is respectfully submitted.

TABLE A.—First Class,

Comprising works first to be executed, as covering partially or entirely great cities and important towns, naval establishments, roads of rendezvous, places and harbors that an enemy might occupy, outlets of valuable commerce, &c.; arranged in geographical order.

Designation of works.	Garrison.		Guns, &c.	Cost to complete.
	Peace.	Siege.		
THESE WORKS ARE IN PROGRESS.				
Fort Independence, Boston harbor	50	395	79	$202, 852
Fort Warren, Boston harbor	100	1, 500	300?	695, 414
Fort Adams, Narraganset roads	100	2, 440	468	350, 000
Fort Schuyler, New York harbor	100	1, 250	250?	510, 178
Fort Columbus, New York harbor	100	535	207	20, 000
Fort Delaware, Delaware bay	100?	1, 250?	250?	?600, 000
Fort Monroe, Hampton roads	500	2, 450	350	210, 000
Fort Calhoun, Hampton roads	50	1, 160	232	531, 000
Fort Caswell, Cape Fear river	50	450	90	60, 000
Fort in Charleston harbor, South Carolina	100	1, 500	300	500, 000
Fort Pulaski, Savannah river	50	860	172	246, 000
Fort Pickens, Pensacola harbor	100	1, 260	252	50, 000
Fort on Foster's bank, Pensacola harbor	50	720	144	160, 000
Maine.				
Fort at the narrows of Penobscot	50	500	145	150, 000
Fort at the mouth of the Kennebec, not projected	50?	500?	150?	?300, 000
Fort Preble, Portland harbor	50	300	82	155, 000

New Hampshire.				
Works in Portsmouth harbor, not projected	150?	1,500?	300?	?500,000
Massachusetts.				
Fort Pickering, Salem harbor	50	250	50	174,000
Fort Winthrop, repairs, &c., Boston harbor	10	250	50	50,000
Works at Provincetown, not projected	50?	1,500?	300?	?600,000
Works at New Bedford, not projected	50?	750?	150?	?300,000
Rhode Island.				
Fort on Rose island, Narraganset roads	25	580	96	123,000
Connecticut.				
Fort Griswold, New London harbor	50	830	106	198,000
New York.				
Fort on Wilkins's Point, New York harbor	50	1,336	184	686,000
Fort Tompkins and dependencies, New York harbor	50	970	114	654,000
Delaware.				
Works to cover the Delaware Breakwater harbor, not projected	100?	1,125?	225?	?600,000
Fort opposite Fort Delaware, on right bank	50	760	112	521,000
Maryland.				
Fort on Elk river, to cover the debouche of the Chesapeake and Delaware canal and railroad	50	760	112	300,000

TABLE A.—First Class, *comprising works first to be executed, &c.*—Continued.

Designation of works.	Garrison.		Guns, &c.	Cost to complete.
	Peace.	Siege.		
Maryland.				
Fort on Sollers's Point flats, below Baltimore	100	835	159	$1,000,000
Fort on Point Patience, Patuxent river	50	400	80	246,000
West Florida.				
Works to protect the navy yard at Pensacola from lateral attack through the bays, not projected	50?	1,000?	50?	?300,000
Fort at Barrancas, Pensacola, not projected	50	250?	50?	?100,000
Louisiana.				
Fort St. Philip, Mississippi river	50	400	60	117,000
Fort at Grand Terre, Barrataria island	50	400	60	400,000
Total	2,585	30,966	5,729	11,609,444

TABLE B.—Second Class,

Comprising works to be constructed next after those of the first, the works having similar objects to defend as those of the first class, and being generally such as are necessary to complete the defence begun by the works of the first class; arranged in geographical order.

Designation of works.	Garrison.		Guns, &c.	Cost to complete.
	Peace.	Siege.		
Maine.				
Fort on House island, Portland harbor	25	260	53	$48,000
Massachusetts.				
Fort at Gloucester, not projected	50?	500?	100?	?200,000
Fort at Naugus Head, Salem harbor	25	180	38	51,000
Fort Sewall, Marblehead harbor	50	280	55	174,000
Fort on Jack's Point, Marblehead harbor	25	280	60	144,000
Fort and outworks on Nantasket Head, Boston harbor	100	1,550	297	975,000
Fort on Gurnet Point, Plymouth, not projected	25?	250?	50	?100,000
Rhode Island.				
Works on Conanicut island, Narraganset roads	100	1,800	386	1,200,000
Connecticut.				
Fort at Stonington harbor, not projected	50?	375?	75?	?200,000
Fort Trumbull, New London harbor	50	460	62	116,000

TABLE B.—SECOND CLASS, *comprising works to be executed next after those of the first, &c.*—Continued.

Designation of works.	Garrison.		Guns, &c.	Cost to complete.
	Peace.	Siege.		
Maryland.				
Fort on Hawkins's Point, below Baltimore	100	845	121	$376,000
Fort McHenry, Covington battery, Redoubt Wood, repairs, &c., renewals	50	500	100	?150,000
Fort on Thomas's Point, Patuxent river	25	350	70	259,000
Fort on Cedar Point, Potomac river, not projected	50?	550	110?	?300,000
South Carolina.				
Works in Port Royal roads, not projected	50?	550?	110?	?300,000
Georgia.				
Fort on Tybee island, not projected	25?	300?	75?	?150,000
Repairs on Fort Jackson, Savannah river, not planned	25?	200?	30?	? 50,000
Works to command the entrance to Cumberland sound, mouth of St. Mary's river, Georgia, not projected	50?	550?	110?	?200,000
Alabama.				
Fort on Dauphin island, Mobile bay	100?	900	128	880,000
Total	975	10,680	2,030	5,873,000

TABLE C.—Third Class,

Comprising the defence of all towns, harbors, inlets, &c., not included in the first two classes; arranged in geographical order.

Designation of works.		Garrison. Peace.	Garrison. Siege.	Guns, &c.	Cost to complete.
Maine.					
Works at Eastport, mouth of St. Croix	?	25	250	50	$100, 000
Works at Machias harbor	?	25	250	50	100, 000
Works at Mount Desert island	?	50	1, 000	200	500, 000
Works at Castine	?	10	125	25	50, 000
Works at St. George's bay, Broad bay, Damariscotta bay, and Sheepscot bay		100	1, 000	200	400, 000
Works in Hog Island channel, Portland harbor	?	.....	.....	.....	135, 000
Works at the mouth of the Saco, at the mouth of the Kennebunk, and at York	?	25	100	30	75, 000
Massachusetts.					
Works at Newburyport	?	25	250	50	100, 000
Works at Beverly	?	10	125	25	50, 000
Reboubt on Hog island, Boston harbor, projected	?	25	150	21	43, 000
Reducing depth of water in Broad Sound passage		.....	.....	.....	210, 000
Reducing altitude of Gallop's island		.....	.....	.....	3, 000
Works at Nantucket harbor, Edgartown harbor, Falmouth harbor, Holmes's Hole, and Tarpaulin cove		50	625	125	250, 000
Rhode Island.					
Repairs and modification of old Fort Wolcott, Newport harbor	?	50	250	45	80, 000
Repairs and modification of old Fort Greene, Newport harbor	?	.....	50	8	20, 000
Closing west passage of Narraganset roads		.....	.....	.....	307, 000

TABLE C.—THIRD CLASS, *comprising the defence of all towns, harbors, inlets, &c.*—Continued.

Designation of works.	Garrison.		Guns, &c.	Cost to complete.
	Peace.	Siege.		
New York.				
Works at Gardiner's bay ?	50	750	150	$400,000
Works at Sag Harbor ?	25	250	50	100,000
Fort Wood, New York harbor, repairs ?	25	225	45	80,000
Fort Gibson, New York harbor, repairs ?	25	100	14	50,000
Fort on Middle Ground shoal, New York harbor, projected	100	1,760	342	1,681,412
Fort on East Bank shoal, New York harbor, projected	100	1,760	332	1,681,412
Connecticut.				
Works at the mouth of Connecticut river ?	25	250	50	100,000
Fort Hale, New Haven harbor, projected	10	220	30	48,000
Fort Wooster, New Haven harbor, projected	10	155	16	42,000
Works for defence of several harbors and towns between New Haven and New York, on both sides of the sound ?	50	500	100	200,000
Maryland.				
Works at St. Mary's river ?	50	550	110	300,000
Works at Annapolis harbor ?	50	500	100	250,000
North Carolina.				
Fort on Baldhead island, Cape Fear river, projected	50	450	90	180,000
Redoubt on Federal Point, Cape Fear river, projected	25	200	43	18,000

South Carolina.					
Works at Georgetown harbor	?	50	500	100	250, 000
Works at the mouth of the Santee, at Bull's bay, and other inlets between Georgetown and Charleston	?	25	250	50	100, 000
Works at Stono inlet	?	10	125	25	50, 000
Works at North Edisto inlet	?	10	125	25	50, 000
Works at South Edisto inlet	?	10	125	25	50, 000
Works at St. Helena sound	?	50	375	75	150, 000
Georgia.					
Works at Wassaw sound	?	50	500	100	200, 000
Works at Ossabaw sound	?	50	500	100	200, 000
Works at St. Catharine's sound	?	50	500	100	200, 000
Works at Sapelo sound	?	50	500	100	200, 000
Works at Doby inlet	?	50	500	100	200, 000
Works at Altamaha sound	?	50	500	100	200, 000
Works at St. Simond's sound	?	50	500	100	200, 000
Works at St. Andrews's sound	?	50	500	100	200, 000
East and West Florida.					
Works at St. Augustine, (estimate of engineer department)	?	25	100	20	50, 000
Works at Key West and Tortugas, (estimate of engineer department)	?	500	2, 500	500	3, 000, 000
Works at Charlotte harbor, Espiritu Santa bay, Apalachicola, Apalache bay, St. Joseph's bay, and St. Rosa bay, (estimate of engineer department)	?	250	1, 250	250	1, 000, 000
Alabama.					
Works at Perdido bay	?	50	500	100	200, 000
Tower at Pass au Heron, projected		10	60	12	25, 000
Total		2, 380	21, 745	4, 283	14, 078, 824

Recapitulation of Tables A, B, and C.

Designation of works.	Garrison.		Guns, &c.	Cost to complete.
	Peace.	Siege.		
First class, from table A	2,585	30,966	5,729	$11,609,444
Second class, from table B	975	10,680	2,030	5,873,000
Third class, from table C	2,380	21,745	4,283	14,078,824
Total	5,940	63,391	12,042	31,561,268

TABLE D.—Fourth Class,

Comprising conditional works, the necessity for which will depend on the creation of artificial harbors, canals, great naval depots, &c.; arranged in geographical order.

Works on Barnstable bay to cover Cape Cod canal.
Works on Buzzard's bay to cover Cape Cod canal.
Works to cover artificial harbor in Martha's Vineyard sound.
Works on Newport News, on Craney island, and on Nasaway shoals, to cover naval depot in Burwell's bay.
Works to cover proposed new outlet of Albemarle sound.

TABLE E,

Exhibiting the cost of certain projected fortifications for the sea-coast defence; the forces necessary to protect them on the supposition that there were no fortifications; the forces necessary for perfect security with the aid of the projected defences; and the expense of the troops in both cases.

Places.	Aggregate cost of the proposed works.	Comparison of the forces necessary to defend the places with and without the projected works.						Expense of the troops kept under pay without fortifications.*	Expenses of the troops kept under pay with the proposed works.		
		No. of troops necessary without fortifications.		No. of troops required with the projected works.							
				Under pay.			Within call.				
		Under pay.	Within call.	Regulars.	Militia.	Total.	Militia.		Expense of the regulars for six months, at $150 per man.	Expense of the militia for six months, at $250 per man.	Expense of regulars and militia.
Portsmouth	?$500,000	10,000	10,000	150	1,500	1,650	8,350	$2,500,000	$22,500	$375,000	$397,500
Boston	2,123,575	10,000	10,000	285	3,845	4,130	5,870	2,500,000	42,750	961,250	1,004,000
Narraganset roads	3,042,369	10,000	10,000	275	5,125	5,400	4,600	2,500,000	41,250	1,281,250	1,322,500
New York	6,077,365	10,000	10,000	500	8,206	8,706	1,294	2,500,000	75,000	2,051,500	2,126,500
Philadelphia	1,121,000	10,000	10,000	150	2,010	2,160	7,840	2,500,000	22,500	502,500	525,000
Baltimore	1,516,000	10,000	10,000	250	2,180	2,430	7,570	2,500 000	37,500	505,000	542,500
Norfolk	3,869,025	10,000	10,000	550	3,610	4,160	5,840	2,500,000	82,500	902,500	985,000
Charleston	824,426	10,000	10,000	300	1,500	1,800	8,200	2,500,000	45,000	375,000	420,000
Savannah	732,367	10,000	10,000	200	1,360	1,560	8,440	2,500,000	30,000	340,000	370,000
New Orleans	961,529	17,000	3,000	350	2,740	3,090	6,910	4,250,000	52,500	685,000	737,500
Total	21,767,656	107,000	93,000	3,010	32,076	35,086	64,914	26,750,000	451,500	7,979,000	8,430,500

Total number of troops necessary without fortifications 200,000
Total number of troops required with the projected works 100,000

* Supposing all to be militia, serving six months, and costing in the average $250 per man.

TABLE E, *exhibiting the cost of certain projected fortifications, &c.*—Continued.

Expense of defending the above-mentioned points during a campaign of six months without fortifications	$26,750,000
With the projected forts	8,430,500
Difference	18,319,500
Total cost of the projected works	21,767,656
Difference	3,448,156

N. B.—In one campaign of six months the difference of expense between the two systems will amount to within $3,448,156 of the whole cost of the projected works. The expense of the troops as above supposes the regular soldier to cost $300 per annum, and the militia soldier $500, officers included in both. No estimate can be made of the enormous contingent expenses in assembling, organizing, and providing militia forces, of hospitals, waste of property, loss of time, &c. This estimate is undoubtedly below the truth. The forces under pay necessary for defence, with the proposed works, consist of peace garrisons, increased by a proportion of militia, the residue of militia under pay being stationed upon the line of approach of the enemy.

TABLE F,

Exhibiting the amount of militia force that may be concentrated at Boston, Newport, New York, Philadelphia, Norfolk, Baltimore, Charleston, Savannah, and New Orleans, successively, from the 1st to the 11th day; each day's march being computed at fifteen miles; founded on the census of 1830.

Days.	Boston.	Newport, R. I.	New York.	Philadelphia.	Norfolk, Va,	Baltimore, Md.	Charleston, S. C.	Savannah, Ga.	New Orleans.
1.....	5, 422	1, 397	20, 218	26, 132	1, 864	10, 046	2, 513	1, 173	3, 032
2.....	28, 351	2, 373	28, 131	26, 521	2, 880	18, 042	7, 160	3, 960	7, 836
3.....	34, 138	12, 340	44, 123	35, 450	4, 416	21, 266	9, 475	5, 948	8, 716
4.....	39, 561	17, 143	57, 925	69, 101	7, 608	27, 916	14, 601	6, 588	12, 499
5.....	49, 127	33, 221	59, 438	70, 806	11, 101	31, 897	18, 443	9, 263	14, 474
6.....	59, 893	42, 807	81, 252	127, 666	14, 511	49, 648	22, 490	19, 725	17, 339
7.....	81, 867	61, 335	104, 180	154, 036	20, 699	65, 382	24, 393	21, 903	17, 906
8.....	97, 697	65, 583	137, 048	167, 703	28, 039	77, 543	29, 416	25, 220	22, 561
9.....	111, 655	83, 111	152, 841	195, 265	32, 562	78, 164	40, 835	36, 630	26, 433
10.....	125, 326	109, 268	164, 116	219, 983	36, 446	87, 520	45, 582	41, 345	28, 140
11.....	144, 076	130, 824	191, 353	221, 603	45, 549	101, 970	59, 701	60, 422	31, 647

ORDNANCE OFFICE, *Washington, March* 8, 1836.

SIR: The resolution of the Senate referred, on the 25th ultimo, to this office, has been duly considered, and, in answer, I have the honor to transmit the following report:

1. IN RELATION TO ARMORIES.

For reasons fully set forth in the letter to you from this office of December 28, 1832, (and as will also appear on reference to the report of Hon. R. M. Johnson, chairman of the military committee, of March 18, 1834,) it is the opinion of this department that, with a view to keep pace in some measure with the rapid increase of the militia, and the consequent demand for arms, there should be established at least one additional armory, to be located at the most eligible point west of the Alleghany mountains.

In a country like the United States, where the population is spread over a territory of great extent, the delay necessarily attending the transportation of arms to distant sections may at times materially affect the public interest; it is therefore suggested that, if two additional armories are deemed necessary to meet the exigencies of the country, one should be provided in the west and one in the south Atlantic States. Including those now at Springfield and Harper's Ferry, there would then be four national armories, two for the Atlantic States and two for the west; that is, if Harper's Ferry may be considered sufficiently near the western States to furnish their supplies by means of the proposed extension of the Chesapeake and Ohio canal.

Two additional armories are therefore estimated for, at $525,000 each—$1,050,000.

This estimate is based on the report of the commissioners, dated January 12, 1825, who were appointed under the authority of an act of Congress, passed March 3, 1823, entitled "An act to establish a national armory on the western waters," and directed to explore the western country with a view to the selection of a suitable site.

2. IN RELATION TO ARSENALS.

It has been urged upon the department by many whose opinions demand consideration, that every State should have an arsenal or depot of arms and munitions within its territorial limits. Should this opinion prevail, and be carried into effect by legislative authority, it would be necessary to construct fourteen arsenals or depots, including the one proposed for the State of North Carolina, for which a bill has been reported by the military committee of the House of Representatives.

A prominent advantage to the public interest in the establishing of these depots consists in their use for the safe-keeping of arms issued to the States, under the law of Congress, passed in 1808, "for arming the whole body of the militia," to be held subject to the orders of their several governors, which would insure their being always available in any emergency.

Some additions may be required, from time to time, at the arsenals already established, which, with the cost of the fourteen above mentioned, are estimated at $1,746,000.

This estimate is founded on the supposition that the new arsenals are to be, on an average, of a medium extent, when considered in relation to those already established, which are divided into four classes, as may be seen by reference to a tabular exhibit presented herewith. It would be proper to arrange every new depot in such manner as to admit of its increase or extension in case the public service should require it. It could then be passed from one class to a higher by the addition of such buildings, tools, or machinery as the case might demand.

3. IN RELATION TO FIELD ARTILLERY.

It is estimated that an adequate supply of field artillery for arming the militia and for troops in service, to be provided within ten years, will amount to 926 pieces, which, with their carriages, implements, and equipments, will cost about $576,175.

This estimate is based on the principle stated in the report before mentioned, and contemplates a supply proportionate to the ratio of the increase of the militia, one piece of artillery being allotted to every 2,000 men.

4. IN RELATION TO ORDNANCE AND ORDNANCE STORES REQUIRED FOR ARMING THE FORTIFICATIONS.

Agreeably to data derived from two statements received from the engineer department on the 11th of January and 27th of February last, it is estimated that the expense of procuring the necessary ordnance and ordnance stores for the full and entire armament of the forts which are erected, together with those now building, and others which are contemplated to be built hereafter, embracing cannon, carriages, implements, and equipments complete, and ammunition, after deducting therefrom the quantity of similar munitions now on hand, will amount to about $17,840,249.

This estimate is founded on the supposition that 12,116 pieces of cannon, with 200 rounds of ammunition for each gun, will be ultimately required when all the forts projected shall have been completed.

It should be stated, however, that this sum may be considered partly conjectural, the plans for the defence of many of the harbors being not yet matured by the board of engineers, as it appears by a letter from the chief of that department, dated February 27 last. There are likewise many other points along the coast which may require defences, the cost of the armament for which has not been embraced in this estimate, nor does it contain any item for the defence of the Mexican frontier.

5. IN RELATION TO SMALL ARMS.

To progress with the arming of the militia to a reasonable extent, in accordance with the settled policy of the country and its civil institutions, a considerable addition should be made to the number of arms on hand. Having reference to the annual increase of citizens who may be called to bear arms, there will be required for the next ten years an expenditure of $7,721,233 for muskets, rifles, and pistols, and $321,880 for swords—total, $8,043,113.

This last sum is found by allotting five swords to every one hundred muskets, or their equivalent in other fire-arms.

6. IN RELATION TO ACCOUTREMENTS FOR SMALL ARMS.

Fifty thousand sets of accoutrements would cost $200,000.

This number distributed among the several arsenals would afford an adequate supply for any emergency; and being in some degree perishable, it is not considered advisable to provide a greater quantity, as they can be made at short notice, or as occasion may require.

7. IN RELATION TO FIELD AMMUNITION OF ALL KINDS.

The expense of providing a supply of gunpowder, cartridge paper, and other materials for field service, is estimated at $200,000.

This amount would afford at all times a supply of ammunition for 30,000 men in each of the principal divisions of the country.

The foregoing statements comprise all the estimates for the ordnance department, except for a national foundery. The amount required for such an establishment will not exceed $300,000, which sum includes the cost of materials to be consumed in casting guns during the first year after commencing operations. The period of ten years is taken as a suitable time within which the foregoing expenditures may be completed.

The disbursements for the various objects embraced in the resolution which pertain to the ordnance department are now, annually, little short of $1,000,000. If a period of fifteen years is assumed for the accomplishment of these purposes, the annual expenditure will be only double what it is at present, and it is believed that such an increase could be made with much advantage to the service. Indeed, that portion of expense which pertains to the manufacture of cannon and projectiles could annually be more than quadrupled with safety and a due regard to economy.

Recapitulation.

2 national armories	$1,050,000
14 arsenals	1,746,000
926 pieces of field artillery, with carriages, &c	576,175
Ordnance and ordnance stores, and ammunition for fortifications	17,840,249
Small arms and accoutrements	8,243,113
Ammunition for field service	200,000
A national foundery	300,000
	29,955,537

The resolution of the Senate is returned herewith.

I have the honor to be, sir, &c.,

GEO. BOMFORD, *Colonel of Ordnance.*

Hon. LEWIS CASS, *Secretary of War.*

Statement of the cost of four classes of arsenals, exclusive of exterior walls, fences, gates, roads, tools, machinery, wharves, &c.

FIRST CLASS—DEPOT, SIMPLY.

Names.	No. of buildings.	Size.	Cost of each.	Total.
Arsenals	2	120 by 40 feet, and 47 feet high	$20,000	$40,000
Great magazine	1	To contain from 2,500 to 3,000 bbls. powder	12,000	12,000
Officers' quarters	1	43 by 40 feet, and 40 feet high	8,000	8,000
Barracks	1	100 by 36 feet, and 35 feet high	13,000	13,000
Gun-carriage shed	1	105 by 30 feet, and 10 feet high	3,050	3,050
Office	1	40 by 20 feet, and 29 feet high	2,430	2,430
Small magazine for fixed ammunition	1	30 by 20 feet, and 14 feet high	756	756
Connecting walls	.....	.....	.....	1,000
Land—25 acres at least.—(See note 1)	.....	Estimated at $40 per acre	.....	1,000
Graduating and levelling the site proper; making drains, culverts, &c.	.....	.....	.....	1,000
				82,236

Statement of the cost of four classes of arsenals, &c.—Continued.

SECOND CLASS—DEPOT AND PLACE OF REPAIR.

Names	No. of buildings.	Size.	Cost of each.	Total.
Arsenal	2	120 by 40 feet, and 47 feet high	$20,000	$40,000
Great magazine	1	To contain from 2,500 to 3,000 bbls. powder	12,000	12,000
Officers' quarters	1	43 by 40 feet, and 40 feet high	8,000	8,000
Barracks	1	100 by 36 feet, and 35 feet high	13,000	13,000
Gun-carriage shed	1	105 by 30 feet, and 10 feet high	3,050	3,050
Smiths' shop	1	25 by 30 feet, and 14 feet high	945	945
Office	1	40 by 20 feet, and 29 feet high	2,430	2,430
Carriage-makers' shop	1	25 by 30 feet, and 14 feet high	945	945
Armorers' and turners' shop	1	50 by 30 feet, and 14 feet high	1,890	1,890
Painters' shop	1	20 by 14 feet, and 14 feet high	352	352
Laboratory, viz:				
Driving and filling shop	1	25 by 25 feet, and 14 feet high	787	787
Finishing room	1	25 by 25 feet, and 14 feet high	787	787
Small magazine for fixed ammunition	1	30 by 20 feet, and 14 feet high	756	756
Connecting wall	.....	.....	.....	1,200
Land—25 acres at least.—(See note)	.....	Estimated at $40 per acre	.....	1,000
Graduating and levelling the site proper, making drains, culverts, &c	.....	.....	.....	1,200
				88,342

Statement of the cost of four classes of arsenals, &c.—Continued.

THIRD CLASS—DEPOT AND PLACE OF CONSTRUCTION AND REPAIR, WITHOUT WATER OR STEAM POWER.

Names.	No. of buildings.	Size.	Cost of each.	Total.
Arsenal	2	120 by 40 feet, and 47 feet high	$20,000	$40,000
Great magazine	1	To contain from 2,500 to 3,000 bbls. powder	12,000	12,000
Officers' quarters	3	43 by 40 feet, and 40 feet high	8,000	24,000
Barracks	1	100 by 36 feet, and 35 feet high	13,000	13,000
Gun-carriage sheds	2	100 by 30 feet, and 10 feet high	3,050	6,100
Smiths' shop	1	80 by 35 feet, and 14 feet high	3,528	3,528
Timber sheds	2	105 by 30 feet, and 10 feet high	2,250	4,500
Office	1	40 by 20 feet, and 29 feet high	2,430	2,430
Carpenters' and carriage-makers' shop	1	80 by 35 feet, and 14 feet high	3,558	3,558
Armorers' and turners' shop	1	50 by 30 feet, and 14 feet high	1,890	1,890
Tinners' and casting shop	1	40 by 25 feet, and 14 feet high	1,260	1,260
Painters' shop	1	30 by 25 feet, and 14 feet high	945	945
Saddlers' shop	1	30 by 25 feet, and 14 feet high	945	945
Laboratory, viz:				
Driving and filling shop	1	25 by 25 feet, and 14 feet high	787	787
Finishing room	1	25 by 25 feet, and 14 feet high	787	787
Small magazine for fixed ammunition	1	30 by 20 feet, and 14 feet high	756	756
Guard room	1	30 by 25 feet, and 14 feet high	945	945
Connecting wall	.....	.....	.....	1,350
Land—25 acres at least.—(See note)	.....	Estimated at $40 per acre	.....	1,000
Graduating and levelling the site proper, making drains, culverts, &c	.....	.....	.....	1,350
Coal-houses	.....	.....	.....	1,000
				122,101

Statement of the cost of four classes of arsenals, &c.—Continued.

FOURTH CLASS—DEPOT AND PLACE OF CONSTRUCTION AND REPAIR, WITH WATER OR STEAM POWER.

Names.	No. of buildings.	Size.	Cost of each.	Total.
Arsenal	2	120 by 40 feet, and 47 feet high	$20,000	$40,000
Great magazine	1	To contain from 2,500 to 3,000 bbls. powder	12,000	12,000
Officers' quarters	3	43 by 40 feet, and 40 feet high	8,000	24,000
Barracks	1	100 by 36 feet, and 35 feet high	13,000	13,000
Gun-carriage sheds	3	100 by 30 feet, and 10 feet high	3,050	9,150
Smiths' shop	1	80 by 35 feet, and 14 feet high	3,528	3,528
Timber sheds	3	105 by 30 feet, and 10 feet high	2,250	6,750
Office	1	40 by 20 feet, and 29 feet high	2,430	2,430
Carpenters' and carriage-makers' shop	1	80 by 35 feet, and 14 feet high	3,528	3,528
Steam engine, or horse for water power	1	100 by 40 feet, and 18 feet high	6,480	6,480
Armorers' shop	1	50 by 30 feet, and 14 feet high	1,890	1,890
Tinners' and casting shop	1	40 by 25 feet, and 14 feet high	1,260	1,260
Painters' shop	1	30 by 25 feet, and 14 feet high	945	945
Saddlers' shop	1	30 by 25 feet, and 14 feet high	945	945
Laboratory, viz:				
Driving and filling shop	1	25 by 25 feet, and 14 feet high	787	787
Finishing room	1	25 by 25 feet, and 14 feet high	787	787
Small magazine for fixed ammunition	1	30 by 20 feet, and 14 feet high	756	756
Guard room	1	30 by 25 feet, and 14 feet high	945	945
Connecting walls	.....	.....	.....	1,450
Land—25 acres at least.—(See note.)	.....	Estimated at $40 per acre	.....	1,000
Graduating and levelling the site proper, making drains, culverts, &c.	.....	.....	.....	1,450
Coal-houses	.....	.....	.....	1,500
				134,581

NOTE 1. Twenty-five acres of land, at least, are necessary at each class of the arsenals, in order to be enabled to prove powder; which operation requires a space of 350 to 400 yards.

2. It is perceived that the expense of the first class may be reduced $20,000, if only one arsenal building be required in that class. The same remark applies to the other classes.

3 There are times when several companies of troops may be required, temporarily at least, at each class of the arsenals. The barracks are, therefore, made of the same size at each of the classes, and large enough to accommodate the companies as well as the troops of the ordnance *proper*. There has always been a deficiency at the arsenals in barracks, when they have been occupied by troops.

4. The above includes everything connected with the buildings and site *proper*, nothing more. The expenses of the apparatus and tools, utensils, engines, &c , which may be necessary to put the several classes into operation, are not included.

5. The extent of the site occupied by each of the classes may be the same; and thus any one class may be enlarged into its next adjacent class, without other expense than is required by the additional buildings.

6. The estimated expenditures in these statements are founded on the prices paid in the vicinity of Philadelphia, and are sufficiently near the truth, it is believed, for all positions which are not in Florida, Louisiana, or Alabama.

ORDNANCE OFFICE, *Washington, March* 8, 1836.

REPORT FROM THE NAVY DEPARTMENT.

NAVY DEPARTMENT, *March* 31, 1836.

SIR: In answer to so much of the resolutions of the Senate of the United States, of the 18th ultimo, as required information as to the probable amount of appropriations that may be necessary to supply the United States with ordnance, arms, and munitions of war, which a proper regard to self-defence would require to be always on hand, and the probable amount that would be necessary to place the naval defences of the United States (including the increase of the navy, navy yards, dock yards, and steam or floating batteries) upon the footing of strength and respectability which is due to the security and welfare of the Union, I have the honor to lay before you a report of the board of navy commissioners, of the 2d instant, which contains the best information upon the subjects referred to in possession of this department, which is respectfully submitted.

MAHLON DICKERSON.

The PRESIDENT *of the United States.*

IN THE SENATE OF THE UNITED STATES.

January 21, 1836,

The following resolutions were ordered to be postponed to Monday next:

Resolved, That so much of the revenue of the United States, and the dividends of stock receivable from the Bank of the United States, as may be necessary for the purpose, ought to be set apart and applied to the general defence and permanent security of the country.

Resolved, That the President be requested to cause the Senate to be informed:

1. The probable amount that would be necessary for fortifying the lake, maritime, and Gulf frontier of the United States, and such points of the land frontier as may require permanent fortifications.

2. The probable amount that would be necessary to construct an adequate number of armories and arsenals in the United States, and to supply the States with field artillery (especially brass field pieces) for their militia, and with side-arms and pistols for their cavalry.

3. The probable amount that would be necessary to supply the United States with the ordnance, arms, and munitions of war, which a proper regard to self-defence would require to be always on hand.

4. The probable amount that would be necessary to place the naval defences of the United States (including the increase of the navy, navy yards, dock yards, and steam or floating batteries) upon the footing of strength and respectability which is due to the security and to the welfare of the Union.

Passed February 18, 1836.

NAVY COMMISSIONER'S OFFICE, *March* 2, 1836.

SIR: The board of navy commissioners have the honor to acknowledge the receipt of your letter of the 26th ultimo, requesting a "report on the probable amount that would be necessary to supply the United States with the ordnance, arms, and munitions of war (so far as may be wanted for the purposes of the navy) which a proper regard to self-defence would require to be always on hand; and on the probable amount that would be necessary to place the naval defences

of the United States (including the increase of the navy, navy yards, dock yards, and steam or floating batteries) upon the footing of strength and respectability which is due to the security and welfare of the Union."

In conformity to these instructions the board respectfully state, with respect to the ordnance for the navy, that after a careful examination of the subject, taking into consideration the ordnance and ordnance stores now on hand, and the extent of force for which it may be expedient to make early provision, they are of opinion that the sum of one million eight hundred thousand two hundred and fifty dollars will be required to supply the ordnance, arms, and munitions of war which may be wanted for the use of the navy, and which a proper regard to self-defence would require to have prepared ready for use.—(See paper A annexed for the detail.)

The board beg leave respectfully to observe, that for the vessels which are now built, or have been specially authorized, armaments may be provided, with some partial exceptions, from the cannon and carronades already provided, and the deficient ordnance, arms, and other ordnance stores will be principally required for the vessels which are yet to be authorized or built. It is therefore respectfully recommended that any appropriation for this purpose, instead of being special or separate, should be included in an appropriation for "building and repairing vessels, and for the purchase of materials and stores for the navy."

The second object of inquiry, as to "the probable amount that would be necessary to place the naval defences of the United States (including the increase of the navy, navy yards, dock yards, and steam or floating batteries) upon the footing of strength and respectability which is due to the security and welfare of the Union," embraces a wide range, requires an examination of several subjects of great importance, and the expression of opinions upon which differences of opinion may and probably will exist. Before any estimate can be formed of the probable *amount* that would be necessary for the purposes proposed an examination must be had, and an opinion formed of the *nature* and *extent* of the naval force which is "necessary to place the naval defences of the United States upon the footing of strength and respectability which is due to the security and welfare of the Union," and the time within which it ought to be, or might be, advantageously prepared.

Taking into view the geographical position of the United States, with reference to other nations with whom we are most likely to be brought into future collision; the great extent of our maritime frontier, and the extreme importance of securing the communications of the whole valley of the Mississippi, though the Gulf of Mexico, and the intercourse between all parts of the coast; the efficient protection of our widely extended and extremely valuable commerce, under all circumstances; and the great naval and fiscal resources of the country, the board consider the proper limit for the *extent* of the naval force to be that which can be properly manned when the country may be involved in a maritime war.

In estimating this extent it is assumed that about ninety thousand seamen are employed in the foreign and coasting trade and fisheries. As the navigation has been generally increasing, there is little reason to apprehend any immediate diminution during peace. In any war which would require the employment of all our naval force, it is believed that such interruptions would occur to our commerce as would enable the navy to obtain without difficulty at least thirty thousand seamen and ordinary seamen; and if it should continue long, it is probable that a larger number might be engaged. The number of thirty thousand, with the landsmen who may be safely combined with them, will therefore be assumed as the number for which vessels ought to be prepared for the commencement of a state of hostilities.

With respect to the *nature* of the force which it would be most advantageous to prepare, there will undoubtedly be differences of opinion. The materials for the larger vessels, as ships of the line and frigates, would be obtained with great

difficulty, under circumstances which would interfere with our coasting trade, whilst sloops of war and smaller vessels could be built with greater comparative facility under such circumstances.

The preparation of a considerable number of steam vessels, ready to defend our great estuaries, to aid in the operations of our other naval force, and in the concentration or movements of the military force, as circumstances might require, is believed to demand serious and early attention.

Having due regard to these and other considerations, the board propose that the force to be prepared, ready for use when circumstances may require it, shall consist of 15 ships of the line, 25 frigates, 25 sloops of war, 25 steamers, and 25 smaller vessels, and that the frames and other timber, the copper, ordnance, tanks, and chain cables shall also be prepared for 10 ships of the line and 10 frigates.

The force proposed to be prepared, ready for use, will employ and can be manned by the 30,000 seamen and others which have been considered available in a state of war. The materials for the ten ships of the line and ten frigates will constitute a necessary reserve for increasing the number of those vessels, should they be required, or for supplying losses from decay or casualties.

To estimate the amount necessary to prepare this force it is proposed to ascertain the whole probable cost, including ordnance, by the average cost of similar vessels already built, (steam vessels excepted,) and of materials already procured, and then to deduct the value of the present force, and all other present available means.

Total cost of 15 ships of the line		$8,250,000
25 frigates		8,750,000
25 sloops		3,125,000
25 steamers		5,625,000
25 smaller vessels		1,250,000
Total for vessels		27,000,000
For the proposed materials, as a reserve		3,315,000
Total amount required		30,315,000
Deduct from this sum the value of the present force and available means, as follows:		
In vessels afloat, valued at $\frac{60}{100}$ of original value, about	$4,440,000	
In vessels building, at actual cost	$2,455,000	
In materials collected for building do	2,945,000	
In treasury for these purposes, October 1, 1835	1,215,000	
For three years' appropriation, "gradual improvement," when due	1,500,000	
Total of present value and available means		12,555,000
Leaves still to be provided for vessels		17,760,000

In presenting any estimate for the amounts which may be necessary to place the different navy yards in a proper situation, the board can do no more than give very general opinions, as the objects of expenditure are foreign to their own professional pursuits, and they have no civil engineer to whom they can refer for the necessary detailed information.

From a knowledge of the cost of works hitherto completed or in progress, and of the wants at the respective yards for the proper preservation of materials, and for extending the means for building, preserving, repairing, and equipping

vessels, they are satisfied, however, that the public interests would be greatly promoted, and, in fact, absolutely require an average annual expenditure of $500,000 for years to come upon the different yards.

In New York the necessity for a dry dock is severely felt already, and its importance will increase with any increase of the navy. This, with its dependencies, will require nearly a million of dollars. At Pensacola, which nature has designated as one of the naval keys of the Gulf of Mexico, and of the immense commerce of the valley of the Mississippi, large expenditures will be necessary to secure adequate means for repairing and subsisting a naval force upon that station, and thus prevent the many evils which would be severely felt in a state of war, if the vessels were obliged to resort to the Atlantic ports for ordinary repairs or supplies of any kind. In other yards there are objects of great and urgent importance.

Generally the proposed arrangements for the preservation of all materials and vessels should precede their collection or construction. Whilst, therefore, the board propose $500,000 as the *average* annual appropriation, until the yards should be placed in proper order, they would also state that appropriations of $700,000, annually, for the next four or five years, and a less sum than $500,000 afterwards, would, in their opinion, be most judicious.

The next subject for consideration is the nature and extent of force proper to be kept employed in a time of peace for the protection of our commercial interests, and to prepare the officers and others for the efficient management of the force proposed for a state of war.

Our commerce is spread over every ocean; our tonnage is second only to that of Great Britain, and the value of articles embarked is believed by many to be fully equal to those transported by the ships of that nation. In the safety and prosperity of this commerce all the other interests of the United States are deeply interested. It is liable to be disturbed and injured in various modes, unless the power of the country, exerted through its naval force, is ready to protect it. It is therefore proposed that small squadrons should be employed upon different stations, subject at all times, however, to such modifications as circumstances may require.

Of these squadrons, one might be employed in the *Mediterranean*, and attend to our interests on the west coasts of Spain and Portugal, and southward to the western coast of Morocco and Madeira.

One in the *Indian ocean* to visit, successively, the most important commercial points east of the Cape of Good Hope, to China, then to cross the Pacific, visit the northern whaling stations and islands, cruise some time upon the west coast of America, and return by way of Cape Horn, the coast of Brazil, and the Windward West India islands.

One in the *Pacific ocean* to attend to our interests upon the west coast of America; keeping one or more vessels at or near the Sandwich and other islands which are frequented by our whale ships and other vessels, and, in succession, cross the Pacific, visiting the islands and southern whaling stations, China, and other commercial places, and return, by the way of the Cape of Good Hope, to the United States.

A squadron upon the *coast of Brazil*, or east coast of South America, might be charged with attention to our interests on the whole of that coast, and upon the north coast so far as to include the Orinoco. If a ship of the line should be employed on this station, it might be occasionally sent round to the Pacific.

A squadron in the *West Indies and Gulf of Mexico* will be necessary for, and may be charged with, attention to the protection of our commerce amongst the West India islands and along the coast of South America, from the Orinoco round to the Gulf of Mexico.

A small *coast squadron* upon our Atlantic coast might be very advantageously employed in making our officers familiarly and thoroughly acquainted with all

our ports and harbors, which would be very useful in a state of war. The vessels would also be ready for any unexpected service, either to transmit information or orders; to reinforce other squadrons, or to visit our eastern fisheries. Besides this cruising force, it is recommended that a ship of the line be kept in a state of readiness for service, *men excepted*, at Boston, New York, and Norfolk and used as receiving ships for the recruits as they are collected; this would give the means of furnishing a considerable increase of force with a very small addition to the current expense.

For the nature and distribution of this force, the following is proposed:

	Line.	Frigates.	Sloops	Steamers.	Smaller.	Total.
Mediterranean	1	2	2	.....	2	7
Indian ocean	.....	1	2	.....	1	4
Pacific	.....	2	3	.....	2	7
Brazil	1	1	2	.....	2	6
West Indies	.....	1	4	1	2	8
Home	*3	1	2	3	1	10
Total	5	8	15	4	10	42

* As receiving ships.

Considering this force with reference to its power of giving experience to the officers, and qualifying them for the management of the force proposed for war, it appears that for the force proposed to be *actually employed at sea*, in peace and in war, the peace force will require and employ about two-thirds the number of commanders of squadrons; about one-third of the captains and forty one-hundredths of the commanders and lieutenants and masters, which the proposed war force would demand, and midshipmen sufficient to supply the additional number of these last classes which a change to a state of war would require.

Supposing the foregoing force to be that which is to be kept in commission, the next question is, what force will be necessary to keep *afloat*, to provide the necessary reliefs? The board believe that this force should be the *least* which will answer the object proposed, as every vessel when launched is exposed to a decay which is much more rapid than when left under the cover of a tight ship-house.

We have already six ships of the line afloat, which will be fully equal to our present wants, when they are repaired. A reserve of three frigates may be required, but only to be launched when the necessity for it shall arise; for the sloops-of-war and smaller vessels, it will probably be sufficient to merely keep up the cruising force as proposed, except some extraordinary demand should arise. The force of steam vessels proposed, when distributed at Boston, New York, Norfolk, and Pensacola, would probably meet all the demands of a state of peace, and furnish useful schools for officers, to prepare them for the proper management of others, when they are required. The force to be kept afloat, then, will be assumed at six ships of the line, eleven frigates, fifteen sloops-of-war, four steamers, and ten smaller vessels. The annual amount necessary to keep this force in a state of repair, and to supply the wear and tear of stores of cruising vessels, is estimated at $950,000.

The estimated expense of the force which is proposed to be kept in commission, exclusive of the repairs as above stated, and for the pay of officers at navy yards, rendezvous, receiving vessels, of superintendents, and civil officers at all the shore establishments, and at the present cost of those establishments, is:

For pay of officers and seamen in commission, superintendents and civil officers, and all others, at all the establishments, about....	$2, 500, 000
For provisions.....	750, 000
For medicines and hospital stores.....	60, 000
For ordnance stores, powder, &c.....	120, 000
For contingencies of all kinds.....	390, 000
Total for the navy branch.....	3, 850, 000

If the marines are continued as a part of the naval establishment, instead of substituting ordinary seamen and landsmen for them in vessels, and watchmen in navy yards, and transferring the marines to the army as artillery, as has sometimes been suggested, the sum of about $400,000 annually will be required for that corps.

To determine the *annual amount* which it may be necessary to appropriate to prepare the vessels and reserve frames and other materials which have been proposed, some *time* must be assumed within which they shall be prepared. Believing that reference to the ability of the treasury to meet the probable demands upon it, for all the purposes of the government, must necessarily be considered in determining what amount may be allotted to the navy, the board have examined the reports of the Secretary of the Treasury, and respectfully propose to establish the ordinary annual appropriation for the navy, including the ordnance, at seven millions of dollars.

The operation of such annual appropriations may be seen by the following recapitulation of the proposed heads of expenditure:

For the force in commission and its dependencies, as before stated	$3, 850, 000
The *average* appropriation for navy yards.....	500, 000
For the repairs and wear and tear of vessels.....	950, 000
For building vessels and purchase of materials.....	1, 300, 000
Total for the navy proper.....	6, 600, 000
For the marine corps.....	400, 000
	7, 000, 000

By the adoption of this gross sum for the navy and its dependencies, and the other items as proposed, $1,300,000 would be annually applied to increasing the number of our vessels and the purchase of materials; and, with this annual expenditure, the deficiency of $17,760,000 would not be supplied sooner than between thirteen and fourteen years, or at about the year 1850. The board consider this as the most *remote* period at which the proposed force ought to be ready, and are of opinion that it might be prepared much sooner, should Congress deem it necessary or advisable to make larger appropriations than have been suggested.

The board have expressed the opinion that no more vessels should be launched than are absolutely necessary to meet the demands for the force to be kept in commission; but, as a necessary consequence, they recommend that the other additional force should be in such a state of readiness that it may be launched and equipped by the time that men could be obtained for it. This arrangement renders an early attention to the completion of all the building-slips, ship-houses, and launching ways at the different yards, so that the ships may be built, and that our docks, wharves, workshops, and storehouses should be finished; that our ships may be equipped with the greatest economy and despatch whenever they may be required.

Before concluding this report, the board would respectfully offer some remarks upon the form of the appropriations, and suggest some attention to existing acts of Congress.

By the separate acts for the gradual increase of the navy; for the gradual improvement of the navy; for building and rebuilding different vessels, altogether seven in number; each appropriation is rendered separate and distinct, although the general object is the same, and requires the use of the same kinds of materials. It is necessary, in conformity to the law of the 3d of March, 1809, that the vouchers, receipts, expenditures, and accounts of each should be kept separately; and, in strictness, no article purchased for one can be applied to the use of another, however desirable or economical such use may be.

It is suggested, therefore, for consideration, whether it might not be very advantageous for Congress to determine, by some general act or resolution, the number and classes of vessels which the President might be authorized to have built, or for which materials might be procured, and then appropriate specially the amounts which might be devoted to those objects, and for keeping the force afloat in repair, under the general head of "For building and repairing vessels, and for purchase of materials and stores."

The adoption of some such plan, and removing the special restrictions which now exist, and requiring, as at present, detailed estimates for the current repairs and reports of proceedings in building vessels and for purchase of materials, would, it is believed, greatly simplify and diminish the number of accounts at the Treasury Department and in all the navy yards, without infringing in any degree the principle of special appropriations; would furnish to Congress all the information they now receive, and would enable us at all times to use those materials which are best prepared and most appropriate for the different objects for which they might be wanted.

The board beg leave, also, respectfully to state their opinion of the necessity for the services of a competent civil engineer for the navy to furnish plans and estimates for all hydraulic and civil objects, and to have a general superintendence of their construction under the direction of the department. The particular character of these works requires the supervision of such a person, not less from motives of economy in the ordinary expenditures than from the more important consideration of their proper arrangement, solidity of construction, and durability.

All which is respectfully submitted.

JNO. RODGERS.

Hon. M. DICKERSON, *Secretary of the Navy.*

A.

Upon the supposition that the naval force to be so prepared that it might be equipped for sea at short notice shall consist of 15 ships of the line, 25 frigates, 25 sloops-of-war, 25 steamers, and 25 smaller vessels; and that the frames and other durable materials shall be provided for 10 ships of the line and 10 frigates as a reserve. The following statement shows the total number and character of the armaments which the whole force will require, the number which can be furnished from the ordnance on hand, and the number which will be still required:

	For ships of line.	Frigates.	Sloops.	Steamers.	S. V.
Total number required.....	25	35	25	25	25
On hand for.....	11	22	16	00	10
Deficient.....	14	13	9	25	15

Besides the bomb-cannon, guns, and carronades for these armaments, there would be required shot, shells, small arms, pistols, and cutlasses, and a supply of powder sufficient for equipping a strong force in case of a sudden emergency.

The cost of these objects may be estimated as follows:

Armaments for 14 ships of the line, at $45,000 each	$630,000
Armaments for 13 frigates, at $16,500 each	214,500
Armaments for 9 sloops, at $6,000 each	54,000
Armaments for 25 steamers, at $3,000 each	75,000
Armaments for 13 smaller vessels, at $1,500 each	19,500
	993,000
For guns, bomb-cannon, and carronades, 100 shot to each gun, and 200 shells to each bomb-cannon, and shells for guns	427,000
8,000 muskets	100,000
3,500 pairs of pistols	43,750
8,000 cutlasses	34,000
9,000 barrels of powder	202,500
	1,800,250

HO. REPS., EX. DOC. No. 206, 26th CONGRESS, 1st SESSION.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with the resolution of the 9th ultimo, a system of national defence and the establishment of national founderies.

MAY 15, 1840.—So much as relates to national founderies referred to a select committee on the subject, and the residue to the Committee on Military Affairs.

WAR DEPARTMENT, *May* 12, 1840.

SIR: In reply to so much of the resolution of the House of Representatives of the 9th ultimo, requesting the Department of War "to lay before this House, as soon as practicable, a report of a full and connected system of national defence, embracing steam and other vessels of war, and 'floating batteries' for coast and harbor defence, and national founderies, and the internal means, auxiliary to these, for transportation and other warlike uses, by land, and that he be requested to furnish this House with the reports submitted to his department at any time by Major General Edmund P. Gaines, or other person or persons of professional experience, of their 'plans of defence,' if any such have been submitted, with the views of the Secretary of War thereon; and that the Secretary furnish an estimate of the expenses of his own and other plans he may report, distinguishing such parts of plans as ought to be immediately adopted and prosecuted, with the probable cost and time of their prosecution and completion:" I have the honor to transmit the accompanying reports of a board of officers, assembled to examine the subject, and to present a connected plan of defence for the maritime and inland frontiers of the United States.

On submitting these reports, I should have considered my duty discharged, had not the resolution required me to give an opinion with regard to the several plans of national defence presented to the department, and to furnish a comparative statement of the cost of each. The plan presented to Congress by Major General Gaines, which will be found in the accompanying printed document, and that now submitted from the board of officers, are the only ones that have been brought to the notice of the department. On the subject of the former, I beg leave to state that, with every respect for the experience of the gallant author, I am constrained to differ from him when he proposes to abandon the system of permanent defences as obsolete, and to rely entirely upon the expedients of vast floating batteries and extensive lines of railroads. The accompanying reports of the board of navy commissioners and the chief topographical engineer exhibit the probable cost of carrying out the general's plans, which far exceeds that of constructing permanent works of defence, without being in any manner so well calculated to protect the country.

After a careful and anxious investigation of a subject involving in so high a degree the safety and honor of the country, I fully concur in the opinions expressed by the board of the superiority of permanent works of defence over all other expedients that have yet been devised, and of their absolute necessity if we would avoid the danger of defeat and disgrace—a necessity rather increased than diminished by the introduction of steam batteries and the use of hollow shot. It would, in my opinion, prove a most fatal error to dispense with them, and to rely upon our navy alone, aided by the number, strength, and valor of the people to protect the country against the attacks of an enemy possessing great naval means. To defend a line of coast of three thousand miles in extent, and effectually to guard all the avenues to our great commercial cities and important naval depots, the navy of the United States must be very superior to the means of attack of the most powerful naval power in the world, which will occasion an annual expense this country is not now able to bear; and this large naval armament, instead of performing its proper function as the sword of the state in time of war, and sweeping the enemy's commerce from the seas, must be chained to the coast or kept within the harbors.

It has been clearly demonstrated that the expense of employing a sufficient body of troops, either regulars or militia, for a period of even six months, for the purpose of defending the coast against attacks and feints that might be made by an enemy's fleet, would exceed the cost of erecting all the permanent works deemed necessary for the defence of the coast. One hundred thousand men divided into four columns, would not be more than sufficient to guard the vulnerable points of our maritime frontier, if not covered by fortifications. An amount of force against an expedition of 20,000 men, which, if composed of regulars would cost the nation $30,000,000 per annum, and if militia, about $40,000,000; and, supposing only one-half the force to be required to defend the coast with the aid of forts properly situated and judiciously constructed, the difference of expense for six months would enable the government to erect all the most necessary works. This calculation is independent of the loss to the nation by abstracting so large an amount of labor from the productive industry of the country, and the fearful waste of life likely to result from such a costly, hazardous, and harassing system of defence.

It must be recollected, too, that we are not called upon to try a new system, but to persevere in the execution of one that has been adopted after mature deliberation, and that is still practiced in Europe on a much more extensive scale than is deemed necessary here; so much more so, that there exist there single fortresses, each of which comprises more extensive and stronger works than is here proposed for the whole line of our maritime frontier. We must bear in mind, also, that the destruction of some of the important points on that frontier would alone cost more to the nation than the expense of fortifying the whole line would amount to, while the temporary occupation of others would drive us into expenses far surpassing those of the projected works of defence.

The organization of permanent defences proposed by the board for our frontiers is not upon military and naval considerations alone, but is calculated to protect the internal navigation of the country. The fortifications proposed, at the same time that they protect our coast from the danger of invasion, and defend the principal commercial avenues and naval establishments, cover the whole line of internal navigation, which, in time of war, will contribute in so essential a manner to the defence of the country by furnishing prompt and economical means of transportation; so that, while the main arteries which conduct our produce to the ocean are defended at their outlets, the interior navigation, parallel to the coast, is protected, and a free communication kept up between every part of the Union.

Although this department is fully aware of the importance of affording permanent and as perfect protection as may be possible to the whole coast, it

regards that section embraced by the shores of the Gulf of Mexico as the most exposed and the most important. It is true that the coast to the eastward of Cape Hatteras possesses points that may attract the attention of an enemy, and that, in the present state of things, the chances of success would justify a hostile enterprise, and are much greater than a wise provision would allow to exist. It is equally so, that, however difficult of access the coast may be from Cape Hatteras to Florida, the nature of a part of its population, and the facility afforded to an enemy by its present neglected condition to blockade and annoy the principal outlets of the valuable exports of that important portion of our country, require our early attention; still, the means of defence from Maine to Florida may be united together, and the parts may afford mutual succor to each other. But the coast of the Gulf of Mexico, on the contrary, is insulated and apart, and must depend altogether upon its own resources. It constitutes the maritime frontier not only of Louisiana, Mississippi, Alabama, and of West Florida, but of Arkansas, Tennessee, Kentucky, Ohio, Missouri, Indiana, and Illinois, and the Territories of Wisconsin and Iowa, embracing nearly three-fourths of the territory of the United States; and it must be borne in mind that the evils which would result from the temporary occupation of the delta of the Mississippi, or from a successful blockade of the coast of the Gulf of Mexico, would not only injure the prosperity of these States, but would deeply affect the interests of the whole Union; and no reasonable expense, therefore, ought to be spared to guard against such a casualty.

Although it would appear, on a superficial view, to be a gigantic and almost impracticable project to fortify such an immense extent of coast as that of the United States, and difficult, if not impossible, to provide a sufficient force to garrison and defend the works necessary for that purpose, yet the statements contained in the reports of the board remove these objections entirely. The coast of the United States throughout its vast extent has but few points which require to be defended against a regular and powerful attack. A considerable portion of it is inaccessible to large vessels, and only exposed to the depredations of parties in boats and small vessels-of-war; against which inferior works and the combination of the same means and a well-organized local militia will afford sufficient protection. The only portions which require to be defended by permanent works of some strength are the avenues to the great commercial cities and naval and military establishments, the destruction of which would prove a serious loss to the country, and be regarded by an enemy as an equivalent for the expense of a great armament. It is shown, also, that the number of men required, on the largest scale, for the defence of these forts, when compared with the movable force that would be necessary without them, is inconsiderable. The local militia, aided by a few regulars, and directed by engineer and artillery officers, may, with previous training, be safely intrusted with their defence in time of war.

It cannot be too earnestly urged that a much smaller number of troops will be required to defend a fortified frontier than to cover one that is entirely unprotected, and that such a system will enable us, according to the spirit of our institutions, to employ the militia effectually for the defence of the country. It is no reproach to this description of force, and no imputation on their courage, to state what the experience of two wars has demonstrated—that they cannot stand the steady charge of regular forces, and are disordered by their manœuvres in the open field; whereas, their fire is more deadly from behind ramparts.

The principles of defence recommended by the board for the maritime frontier of the United States are applicable to the northern or lake frontier and to that of the west. Some few sites are recommended to be occupied by fortifica-

tions, both to afford protection to places fast growing up into important cities, and to furnish a refuge and rallying point for our naval and land forces.

Very respectfully, your most obedient servant,

J. R. POINSETT.

Hon. R. M. T. HUNTER,
Speaker of the House of Representatives.

WASHINGTON, *May* 10, 1840.

SIR: The board of officers to whom the subject of the military defences of the country was committed have the honor to submit the following report, viz:

1st. Report on the defence of the Atlantic frontier, from Passamaquoddy to the Sabine. This is divided into two distinct portions, viz: the coast from Passamaquoddy to Cape Florida, and the coast from Cape Florida to the Sabine bay.

2d. Report on the defence of the northern frontier, from Lake Superior to Passamaquoddy bay.

3d. Report on the western frontier, from the Sabine bay to Lake Superior.

Connected with these reports are tabular statements, showing the "permanent defence commenced, completed, projected, or deemed necessary;" with conjectural estimates of "the probable expense of constructing or completing such works as may not yet have been completed or commenced."

4th. Reports "on the armories, arsenals, magazines, and founderies, either constructed or deemed necessary; with a conjectural estimate of the expense of constructing such of said establishments as may not yet be completed or commenced, but which may be deemed necessary."

Hon. J. R. POINSETT,
Secretary of War.

REPORT ON THE DEFENCE OF THE ATLANTIC FRONTIER, FROM PASSAMAQUODDY TO THE SABINE.

So entirely does this board concur in the views presented on several occasions, within the last twenty years, by joint commissions of naval and military officers, by the board of engineers for fortifications, and by individual officers who have at various times been called on to treat the same subject, that in quoting their opinions we should, for the greater part, express our own. But though these reports are, some of them, comprehensive and elaborate, we suppose that an explicit statement of our views, at least as to the great principles on which the system of defence should be erected, is expected from us, especially as the system now in progress has been the subject of a criticism which, considering the high official source whence it emanated, may be supposed to have disturbed the confidence of the public therein.

The nature and source of that criticism, attacking as it does fundamental principles, and inculcating doctrines which we believe to be highly dangerous, will lead us at times into amplifications that we fear may prove tedious. This, however, we must risk, trusting to the importance of the subject for excuse, if not for justification.

The principal errors, as we conceive, in the document * referred to are—

1. That for the defence of the coast the chief reliance should be on the navy.

2. That, in preference to fortifications, floating batteries should be introduced wherever they can be used.

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* See Senate document No. 293, vol. 4, p. 1, 24th Congress, 1st session.

3. That we are not in danger from large expeditions; and, consequently,

4. That the system of the board of engineers comprises works which are unnecessarily large for the purposes they have to fulfil.

On these topics, together with other errors of the same nature, we shall feel constrained to enlarge.

The first question that presents itself is this: *What, in general terms, shall be the means of defence?*

We have a seacoast line of more than three thousand miles in extent, along which lie scattered all the great cities, all the depots of commerce, all the establishments of naval construction, outfit, and repair, and towns, villages, and establishments of private enterprise without number. From this line of seacoast navigable bays, estuaries, and rivers, the shores of which are similarly occupied, penetrate deep into the heart of the country.

How are the important points along this extended line to be secured from hostile expeditions, especially since one of the prominent causes of the prosperity of these various establishments, namely, facility of access from the ocean, is, as regards danger from an enemy, the chief cause of weakness?

Shall the defence be by a navy exclusively?

The opinion *that the navy is the true defence of the country* is so acceptable and popular, and is sustained by such high authority, that it demands a careful examination.

Before going into this examination we will premise that by the term "navy" is here meant, we suppose, line-of-battle ships, frigates, smaller sailing vessels, and armed steamships, omitting vessels constructed for local uses merely, such as floating batteries.

For the purpose of first considering this proposition in its simplest terms, we will begin by supposing the nation to possess but a single seaport, and that this is to be defended by a fleet alone.

By remaining constantly within this port our fleet would be certain of meeting the enemy, should he assail it. But if inferior to the enemy, there would be no reason to look for a successful defence; and as there could be no escape for the defeated vessels, the presence of the fleet, instead of averting the issue, would only render it the more calamitous.

Should our fleet be equal to the enemy's, the defence might be complete, and it probably would be so. Still, hazard—some of the many mishaps liable to attend contests of this nature—might decide against us; and, in that event, the consequences would be even more disastrous than on the preceding supposition. In this case the chances of victory to the two parties would be equal, but the consequences very unequal. It might be the enemy's fate to lose his whole fleet, but he could lose nothing more; while we, in a similar attempt, would lose not only the whole fleet, but also the object that the fleet was designed to protect.

If superior to the enemy, the defence of the port would in all respects be complete. But, instead of making an attack, the enemy would, in such case, employ himself in cutting up our commerce on the ocean; and nothing could be done to protect this commerce without leaving the port in a condition to be successfully assailed.

In either of the above cases the fleet might await the enemy in front of the harbor, instead of lying within. But no advantage is apparent from such an arrangement, and there would be superadded the risk of being injured by tempests, and thereby disqualified for the duty of defence, or of being driven off the coast by gales of wind; thus, for a time, removing all opposition.

In the same cases, also, especially when equal or superior to the enemy, our fleet, depending on having correct and timely notice as to the position and state of preparation of the enemy's forces, might think proper to meet him at the outlet of his own port, or intercept him on the way, instead of awaiting him

within or off our own harbor. Here it must be noticed that the enemy, like ourselves, is supposed to possess a single harbor only; but having protected it by other means, that his navy is disposable for offensive operations. If it were attempted thus to shut him within his own port, he, in any case but that of decided inferiority, would not hesitate to come out and risk a battle; because, if defeated, he could retire, under shelter of his defences, to refit, and, if successful, he could proceed with a small portion of his force—even a single vessel would suffice—to the capture of our port, now defenceless; while, with the remainder, he would follow up his advantage over our defeated vessels, not failing to pursue them into their harbor, should they return thither.

Actual superiority on our part would keep the enemy from volunteering a battle; but it would be indispensable that the superiority be steadily maintained, and that the superior fleet be constantly present. If driven off by tempests, or absent from any other cause, the blockaded fleet would escape, when it would be necessary for our fleet to fly back to the defence of its own port. Experience abundantly proves, moreover, that it is in vain to attempt to shut a hostile squadron in port for any length of time. It seems, then, that whether we defend by remaining at home, or by shutting the enemy's fleet within his own harbor, actual superiority in vessels is indispensable to the security of our port.

With this superiority the defence will be complete, provided our fleet remain within its harbor. But then all the commerce of the country upon the ocean must be left to its fate; and no attempt can be made to react offensively upon the foe, unless we can control the chances of finding the enemy's fleet within his port, and the still more uncertain chance of keeping him there; the escape of a single vessel being sufficient to cause the loss of our harbor.

Let us next see what will be the state of the question on the supposition of numerous important ports on either side, instead of a single one; relying, on our part, still, exclusively on a navy.

In order to examine this question, we will suppose our adversary to be fortified in all his harbors, and possessed of available naval means equal to our own. This is certainly a fair supposition; because what is assumed as regards his harbors is true of all maritime nations, except the United States; and as regards naval means, it is elevating our own strength considerably above its present measure, and above that it is likely to attain for years.

Being thus relatively situated, the first difference that strikes us is that the enemy, believing all his ports to be safe, without the presence of his vessels, sets at once about making our seas and shores the theatre of operations, while we are left without choice in the matter; for if he think proper to come, and we are not present, he attains his object without resistance.

The next difference is, that while the enemy (saving only the opposition of Providence) is certain to fall upon the single point, or the many points he may have selected, there will exist no previous indications of his particular choice, and, consequently, no reason for preparing our defence on one point rather than another; so that the chances of not being present and ready on his arrival are directly in proportion to the number of our ports, that is to say, the greater the number of ports the greater the chances that he will meet no opposition whatever.

Another difference is, that the enemy can choose the mode of warfare, as well as the plan of operations, leaving as little option to us in the one case as in the other. It will be necessary for us to act, in the first instance, on the supposition that an assault will be made with his entire fleet; because, should we act otherwise, his coming in that array would involve both fleet and coast in inevitable defeat and ruin. Being in this state of concentration, then, should the enemy have any apprehensions as to the result of a general engagement; should he be unwilling to put any thing at hazard; or should he, for any other reason, prefer acting by detachments, he can, on approaching the coast, disperse his force into small squadrons and single ships, and make simultaneous attacks on numerous

points. These enterprises would be speedily consummated; because, as the single point occupied by our fleet would be avoided, all the detachments would be unopposed; and after a few hours devoted to burning shipping, or public establishments, and taking in spoil, the several expeditions would leave the coast for some convenient rendezvous, whence they might return, either in fleet or in detachments, to visit other portions with the scourge.

Is it insisted that our fleet might, notwithstanding, be so arranged as to meet these enterprises?

As it cannot be denied that the enemy may select his point of attack out of the whole extent of coast, where is the prescience that can indicate the spot? And if it cannot be foretold, how is that ubiquity to be imparted that shall always place our fleet in the path of the advancing foe? Suppose we attempt to cover the coast by cruising in front of it, shall we sweep its whole length?—a distance scarcely less than that which the enemy must traverse in passing from his coast to ours. Must the Gulf of Mexico be swept, as well as the Atlantic? or shall we give up the Gulf to the enemy? Shall we cover the southern cities, or give them up also? We must, unquestionably, do one of two things: either relinquish a great extent of coast, confining our cruisers to a small portion only, or include so much that the chances of intercepting an enemy would seem to be out of the question.

On the practicability of covering even a small extent of coast by cruising in front of it—or, in other words, the possibility of anticipating an enemy's operations; discovering the object of movements of which we get no glimpse, and hear no tidings; and seeing the impress of his footsteps on the surface of the ocean—it may be well to consult experience.

The Toulon fleet, in 1798, consisting of about twenty sail of line-of-battle ships and frigates, about twenty smaller vessels-of-war, and nearly two hundred transports, conveying the army of Egypt, slipped out of port and surprised Malta. It was followed by Nelson, who, thinking correctly that they were bound for Egypt, shaped his course direct for Alexandria.

The French, steering towards Candia, took the more circuitous passage, so that Nelson arrived at Alexandria before them; and, not finding them there, returned, by the way of Caramania and Candia, to Sicily, missing his adversary in both passages. Sailing again for Alexandria, he found the French fleet at anchor in Aboukir bay; and, attacking them, achieved the memorable victory of the Nile.

When we consider the narrowness of this sea; the very numerous vessels in the French fleet; the actual crossing of the two fleets on a certain night; and that Nelson, notwithstanding, could see nothing of the enemy himself, and hear nothing of them from merchant vessels, we may judge of the probability of waylaying our adversary on the broad Atlantic.

The escape of another Toulon fleet in 1805; the long search for them in the Mediterranean by the same able officer; the pursuit in the West Indies; their evasion of him amongst the islands; the return to Europe; his vain efforts, subsequently, along the coast of Portugal, in the Bay of Biscay, and off the English channel; and the meeting at last at Trafalgar—brought about only because the combined fleets, trusting to the superiority that the accession of several reinforcements had given, were willing to try the issue of battle: these are instances, of many that might be cited, to show how small is the probability of encountering, on the ocean, an enemy who desires to avoid a meeting; and how little the most untiring zeal, the most restless activity, the most exalted professional skill and judgment, can do to lessen the adverse chances. For more than a year Nelson most closely watched his enemy, who seems to have got out of port as soon as he was fully prepared to do so, and without attracting the notice of any of the blockading squadron. When out, Nelson, perfectly in the dark as to the course Villeneuve had taken, sought for him in vain on the coast of Egypt.

Scattered by tempests, the French fleet again took refuge in Toulon; whence it again put to sea, when refitted and ready, joining the Spanish fleet at Cadiz.

On the courage, skill, vigilance, and judgment acceded on all hands to belong, in a pre-eminent degree, to the naval profession in this country, this system of defence relies to accomplish, against a string of chances, objects of importance so great that not a doubt or misgiving as to the result is admissible. It demands of the navy to do perfectly, and without fail, that which to do at all seems impossible. The navy is required to know the secret purposes of the enemy, in spite of distance and the broken intercourse of a state of war, even before these purposes are known to the leader who is to execute them; nay, more, before the purpose itself is formed. On an element where man is but the sport of storms, the navy is required to lie in wait for the foe at the exact spot and moment, in spite of weather and seasons; to see him in spite of fogs and darkness. Finally, after all the devices and reliances of the system are satisfactorily accomplished, and all difficulties subdued, it submits to the issue of a single battle, on equal terms, the fate of the war, having no resource or hope beyond.

It may here be alleged that the term *navy*, as applied to the defence of the country, means more than the sea-going vessels we have enumerated; that it means, also, gunboats, floating batteries, and steam batteries; and that the true system of defence for the coast requires us to provide all our harbors with some or all of these vessels, according to local circumstances; leaving to the sea-going vessels the duty of destroying the enemy's commerce, carrying the war into the enemy's seas, and contending for the mastery of the ocean.

But such a proposition is totally distinct from that we have been considering. This is one that we regard as, in part, perfectly sound; as containing, though not true throughout, the great principle on which the present glory of the navy proper has been built, and its future glory will depend.

We are aware that some of our ships have been blockaded within our harbors, but we are not aware that any of the high distinction achieved by that service has been gained in these blockaded ships.

On the other hand, we know that, instead of lying in harbor and contenting themselves with keeping a few more of the enemy's vessels in watch over them than their own number—instead of leaving the enemy's commerce in undisturbed enjoyment of the sea, and our own commerce without countenance or aid—they scattered themselves over the wide surface of the ocean, penetrated to the most remote seas, everywhere acting with the most brilliant success against the enemy's navigation. And we believe, moreover, that in the amount of enemy's property thus destroyed, of American property protected or recovered, and in the number of hostile ships kept in pursuit of our scattered vessels—ships, evaded if superior, and beaten if equal—they rendered benefits a thousand fold greater, to say nothing of the glory they acquired for the nation and the character they imparted to it, than any that would have resulted from a state of passiveness within the harbors.

Confident that this is the true policy as regards the employment of the navy proper, we doubt not that it will, in the future, be acted on as it has been in the past, and that the results, as regards both honor and advantage, will be expanded commensurately with its own enlargement.

In order, however, that the navy may always assume and maintain that active and energetic deportment in offensive operations, which is at the same time so consistent with its functions and so consonant with its spirit, we have shown that it must not be occupied with mere coast defence.

But if the navy is to be relieved from this home duty some other reliance must be substituted; the navy itself requiring, for its own establishments, not less than the towns and harbors, that the defence be complete. And this brings us to consider whether the floating defences mentioned above, namely, gunboats, floating batteries, and steam batteries, constitute the best reliance.

After considering these defensive means, we will examine the properties of forts and land batteries, these being the only other well-tried resort; and, that a comparison may be instituted, we will confine ourselves to cases where the latter are properly applicable.

There are, doubtless, situations where it may be necessary for us to present a defensive array, at the same time that to do so by fortifications alone would be impracticable; and it is not, therefore, prejudging the question we are about to examine; it is neither underrating fortifications, nor overrating these floating defences, to say that these last are, some or all of them, indispensable in such positions.

Any very broad water, where deep soundings may be carried at a distance from the shores greater than effective gun range, and where no insular spot, natural or artificial, can be found or formed nearer the track of ships, will present such a situation; and we may take some of our great bays as examples.

Broad sounds and wide roadsteads, affording secure anchorage beyond good gun range from the shores, will afford examples of another sort; and harbors with very wide entrances and large surface exhibit examples of still another kind.

As, in all such cases, fortifications alone will be ineffectual, and, nevertheless, recourse to defences of some sort may be unavoidable, it has not failed to be a recommendation in the several reports on the defence of the coast, since 1818, that there should be a suitable and timely provision of appropriate floating defences. And until the invention of man shall have caused an entire revolution in the nature of maritime attack and defence, these or kindred means must be resorted to; not, however, because they are means intrinsically good, or suitable under other circumstances, but because they are the only means applicable.

In the circumstances just referred to there is no alternative, and therefore no point to be discussed. The remaining question is, whether these floating defences are to be relied on in cases that admit of defence by fortifications.

And, first, as to gunboats. Although of undoubted use in peculiar circumstances, it will hardly be contended that gunboats afford a safe reliance in harbors that can be entered by vessels of magnitude. Ships becalmed or aground might be sorely harassed, if not destroyed, by a spirited attack from this force, and there are other situations wherein it would be very effective. But harbors defended by gunboats will not be attacked in calms nor with adverse winds; and it is not easy to believe that any probable array of these craft would impede or hinder for a moment the advance of a hostile fleet. Nelson, at Trafalgar, bore down in two divisions upon the combined fleet, each division being exposed to a raking fire; and, although suffering considerably from that fire, he was able, notwithstanding, to break the hostile line and defeat his superior adversary. What, comparatively with the raking fire of the combined fleet, would be the fire of a fleet of gunboats? Opposing no effectual obstacle to approach or entrance, these small vessels, scattered and driven upon the shoals, would be kept, by the broadside of a few active vessels, at too great a distance to produce any serious effect upon the main attack by their desultory fire.

Although they might afford useful means of annoyance during a protracted occupation by the enemy of harbors that contained extensive shoal grounds and shallow bays and inlets, they would be nearly useless in resisting the first assault, and in preventing the brief operation of levying contributions, or burning or spoiling national establishments.

The true reason of this feeble defence must not, however, be misunderstood. It is not that the boats do not carry guns enough or men enough for the object, but it is because, from the comparative weakness of the vessels, the guns and the men cannot be kept in an effective position.

There are, moreover, many harbors requiring defence in which there are no shoals whereon these boats could take refuge, and in such their capture or destruction would be inevitable should there be, at the same time, no river up which they might fly, or lateral issue through which they could escape to a safe distance.

Floating batteries, of which good use might be sometimes made in peculiar situations, would, we suppose, differ from gunboats, in being larger, containing many guns, and in being stronger—that is to say, having thicker sides or bulwarks; and it has sometimes even been proposed to construct them with ball proof parapets, and with platforms open above, like, in these respects, batteries upon the shore. But, in whatever way formed, it is necessarily a part of the idea that they be strong and massive; and, consequently, that they be unwieldy, incapable of sudden change of place, and incapacitated either to advance upon a defeated foe or to evade a victorious one. We are not, of course, now speaking of batteries moved by steam.

Being denied the power of locomotion, at least for any purpose of manœuvering in face of the enemy, we are to consider these batteries as moored in position and awaiting his advance. Should the batteries be large, requiring deep water to float them, or should they be placed across or near the channel for the sake of proximity to the track of ships, the enemy would engage them at close quarters. All advantages of mobility—of concentrating his whole fleet upon one or two points, to which, under these circumstances, no relief can be sent—of greater elevation and command, would be on the side of the assailant; with no countervailing advantage to the batteries, but greater thickness of bulkwarks. Whether this excess of thickness should be considered a material advantage, since the introduction of large bomb-cannon into the armament of ships, is a doubtful matter. The batteries, if anchored across the channel, would have the further advantage of a raking fire: but we have seen that the raking fire of one squadron of ships upon another advancing is by no means decisive. The power of throwing the whole assailing force upon one or two points, of pouring upon the decks of the batteries a greatly superior force of boarders, would, of themselves, seem to leave little room to doubt as to the issue.

If now we suppose these floating batteries to be smaller, so that, having a lighter draught, they might be placed near the shores or upon the shoals, they might certainly be thereby saved from the kind of attack which would prove so fatal if anchored more boldly in deep water; but they would, at the same time, lose much of their efficiency from their remoteness; and positions wherein they would be secure from being laid alongside, while they would be in a proper attitude to contribute materially to the defence of the harbor, are afforded but rarely. It is doubtful whether, as a general rule, these smaller floating batteries, notwithstanding their greater capability of endurance, would afford a better defence, gun for gun, than gunboats; or, in other words, whether this capability of endurance in the one would be more than a compensation for the power of locomotion in the other.

But whether near the shore or in the channel, whether large or small, this description of defence, owing to its fixedness, connected with the destructibility of the material of which it must be made, will be exposed to attacks analogous to those made by gunboats on ships aground. The enemy, knowing of what the defensive arrangements consist, will come provided with the requisite number of sailing or steam vessels, armed with bomb-cannon, against which the thicker bulwarks of the floating batteries would avail nothing. He would, besides, hardly fail to provide himself with bomb-ketches armed with heavy sea-mortars; and, as there could be no guarding against the effects of the long ranges of these, a few such vessels would, with great certainty, constrain the floating batteries to quit their position, abandoning every disposition approaching to a concentrated array. Not to mention other modes of attack which would seem to leave

the chances of success with the enemy, it will be noticed that this kind of defence, whether by gunboats or floating batteries, has the same intrinsic fault that an inactive defence by the navy proper has; that is to say, the enemy has it in his power to bring to the attack a force of the same nature, and at least as efficacious, as that relied on for defence; hence the necessity not of mere equality, but of *superiority*, on the part of the defence at every point liable to be attacked; and hence, also, the necessity of having an aggregate force as many times larger than that disposable by the enemy as we have important places to guard. Should we, for example, have ten such places, and the enemy threaten us with twenty ships of the line, we must have in all these places an aggregate of gunboats and floating batteries more than equivalent to two hundred ships of the line; for it will hardly be contended that these defences can be transported from one place to another as they may be respectively in danger.

But what will be the relative state of the parties if, instead of gunboats or floating batteries, we resort to steam batteries? Although much has been said of late of the great advantage that defence is to derive from this description of force, we have not been able to discover the advantages; nor do we see that sea-coast defence has been benefited in any particular by the recent improvement in steam vessels, except that, in the case before adverted to, where, from the breadth of the waters, defence from the shore would be unavailing, a more active and formidable floating defence than by gunboats and floating batteries is provided. It must be remembered that by far the greatest improvement in steam vessels consists in having adapted them to ocean navigation; and one inevitable consequence of this improvement will be that, if the defence of harbors by steam batteries be regarded as securing them from the attacks of ships of the line and frigates, or, at least, of placing the defence quite above that kind of attack, they will no longer be attacked by sailing vessels, but by steam vessels, similar in all warlike properties to those relied on for defence.

Not only is there no impediment to transferring these vessels across the ocean, but the rapidity and certainty of these transfers are such as to enjoin a state of the most perfect readiness everywhere and at all times, and also a complete independence of arrangement at each particular point; both the state of preparation and the independence of arrangement being much more important than when the enemy's motions were governed by the uncertain favor of winds and weather.

It is not easy to conceive of any important properties belonging to steam batteries acting defensively that the attacking steam vessels may not bring with them, or, at least, may not have imparted to them on their arrival upon the coast, unless it should be thought proper to give to the former a greater thickness of bulwark than would be admissible in sea-going vessels.

But the peculiar advantage conferred by steam lies in the facility of moving with promptitude and rapidity; and any attempts to strengthen the harbor vessels by thickening their bulwarks considerably would unavoidably lessen their mobility, thereby partially neutralizing the advantage sought. At the same time, it is extremely doubtful whether any benefit would be derived from the thicker sides. It is probable that the best kind of bulwark for these vessels and all others is that which will be just proof against grape and canister shot fired from moderate distances; because, with such bulwarks, a shell fired from a bomb-cannon within a reasonable distance would pierce both sides; that is to say, would go in on one side of the ship and out at the opposite, producing no greater effect than a solid shot of the same calibre, while, with thickened sides, every shell would lodge in the timbers, and produce terrible ravages by bursting.

In the practice with these missiles in this country it has been found difficult to lodge a shell in thin targets, even when the load of the gun was so reduced as to increase materially the uncertainty of aim. As it is probable, therefore, that the protection from solid shot afforded by massive bulwarks would be more

than counterbalanced by the greater injury horizontal shells would inflict by means of these bulwarks, we may conclude that the harbor steam battery will not differ in this respect materially from the attacking steamships, and, if they do differ in having more solid and impervious bulwarks, that no advantage over the enemy will result therefrom. We come, therefore, to the same result as when considering the application of the other kinds of floating force to the defence of harbors; and this result is, that there is no way of placing the coast in a condition of reasonable security but by having at any point the enemy may happen to select a force in perfect readiness which shall be superior to that brought to the attack.

The reason of this coincidence of result is, that no peculiarity in form or details can disguise the difficulties or essentially modify the conditions inseparable from the nature of a floating force.

Buoyancy is a condition necessary to every variety of the force, and to observe this condition a common material must be used in each—a material that is combustible, weak, and penetrable to missiles. If the weakness and penetrability be in part remedied by an increase of the quantity of the material, it must be at the sacrifice of buoyancy, activity, and speed—properties of great value. If a small draught of water be desired, it can only be obtained at the expense of that concentration of power which is a great and almost characteristic quality of naval armament.

It might not be strictly true to say that as much would be lost in one respect as would be gained in another; but, though modifications of this floating force, made with a view to adapt it to peculiar services, will somewhat disturb the equilibrium of the several kinds, there will still be no great disparity when acting in their appropriate way, and a little superadded force to the weaker party will restore the balance. None of these modifications, it should be observed, touch, on the one hand, the means whereby injury is inflicted, nor, on the other, the susceptibility to injury. All are still timber structures, carrying a common armament.

The necessity of having at each point a force at least equal to the attacking force will require large preparations on any supposition. With the navy proper, however, with gunboats and floating batteries, something has already been done; the existing navy will be an important contribution. Small vessels supplied by commerce would afford tolerable substitutes for gunboats, and from the class of merchant ships many vessels might be drawn for service as floating batteries; still there will remain great efforts to be made and great amounts to be expended, to complete the defensive array. But a reliance on steam batteries would lead to expenditure vastly greater, because with them all has yet to be provided. Having at present no force of this kind on hand, (or next to none,) the preparation by the enemy of (say) twenty steam frigates would require the construction of two hundred of equal force on our part, supposing that we design to cover but ten of our principal harbors, leaving all others at his mercy.

Having shown that steam batteries cannot be substituted for shore defences, we will here add that they will, on the other hand, in certain cases necessarily increase the number of these defences, and in other cases augment their force. Channels which admitted only small vessels-of-war would, in peculiar positions, need no defence; in other positions their defence might be safely trusted to works of moderate force. The introduction of these vessels of small draught and great power requires, however, that these passages should be defended and defended adequately.

We should not have gone so much at length into a branch of our subject wherein the general conclusions appear to be so obvious and incontrovertible, but for the prevalence of opinions which we consider not erroneous merely, but highly dangerous, and which, we think, must give way before a full exhibition of the truth. We do not anticipate any formidable objections to the positions

assumed nor to the illustrations; but even should all these, in the form we have presented them, be objected to, we may still challenge opposition to the following broad propositions, namely:

1st. If the sea-coast is to be defended by naval means exclusively, the defensive force at each point deemed worthy of protection must be at least equal *in power* to the attacking force.

2d. As, from the nature of the case, there can be no reason for expecting an attack on one of these points rather than on another, and no time for transferring our state of preparation from one to another after an attack has been declared, each of them must have assigned to it the requisite means; and,

3d. Consequently this system demands a power in the defence as many times greater than that in the attack as there are points to be covered.

Believing that a well-digested system of fortifications will save the country from the danger attending every form of defence by naval means, and the intolerable expense of a full provision of those means, we will now endeavor to show that such a system is worthy of all reliance.

There has been but one practice among nations as to the defence of ports and harbors; and that has been a resort to fortifications. All the experience that history exhibits is on one side only; it is the opposition of forts, or other works comprehended by the term *fortification*, to attacks by vessels; and although history affords some instances wherein this defence has not availed, we see that the resort is still the same. No nation omits covering the exposed points upon her seaboard with fortifications, nor hesitates in confiding in them.

In opposition to this mode of defence much stress is laid on certain successful attacks that have been made by ships on works deemed strong. We have no doubt that all such results might be accounted for by circumstances independent of the naked question of relative strength; but at any rate, when carefully considered, how little do these results prove, in comparison with numerous other instances, in which there was an immense disparity of force in favor of vessels that have been signally defeated. These latter instances are those that should be received as a test of the actual relation between the two kinds of force; not certainly because they were successful, but because the smaller the work, its armament, its garrison, the less the probability that any extraneous influence has been in operation. A single gun behind a parapet, provided its position be a fair one, and the parapet be proof, need, as regards its contest with ships, owe nothing else to the art of fortification; and its effect will be the same whether the battery were fresh from the hands of the ablest engineer of the age, or were erected at the dawn of the art. The gun is in a position to be used with effect; the men are as fully protected by the parapet as the service of the gun will allow; they are brave and skilful, and there is nothing to prevent their doing their duty to the utmost. These are all conditions easily fulfilled, and therefore likely to be so. The state of things is not less just and fair toward the vessel; she chooses her time and opportunity; the battery goes not to the ship, but the ship to the battery; taking the wind, the tide, the sea—all, as she would have them; her condition and discipline are perfect, and her crew courageous and adroit. Nothing, under such circumstances, can prevent the just issue of battle but some extraordinary accident—possible, indeed, to either party, but easily recognized when occurring.

The contest between larger works and heavy squadrons may be much more complicated affairs, the cause of disaster to the former being often traceable to potent, though not always obvious, influences. The fortifications may have been absurdly planned originally or badly executed, for there has at all times been in this profession, as in others, much scope given to quackery; they may have been erected at a time when the ships-of-war, against which they were provided, were very different things from the lofty line-of-battle ships of modern times; a long peace or long impunity may have left them in a state wholly un-

prepared for the sudden use of their strength; the command may have been intrusted to persons ignorant alike of the amount of power in their hands and of the mode of exercising it; the garrison may have been undisciplined or mutinous—the populace discontented or disloyal; the clamor of frightened citizens may have caused a premature surrender: all these, or any of them, may have produced the issue, leaving the question of relative power untouched.

While there can be no doubt that these and other deteriorating influences may have occasionally operated to the prejudice of fortifications, and that these were likely to be more numerous and more controlling as the works were more extensive, it is certain that there can be no influence acting in a reverse direction upon them; that is to say, none making them stronger and more efficient than they ought to be. There can be no favorable influence of such a nature, for example, as to make the simple one-gun battery before mentioned equivalent to a battery (say) ten times as large.

It must not be supposed, from what we have said in relation to larger fortifications, that their magnitude necessarily involves imperfection or weakness; nor, because we have considered small and simple works as affording the best solution to the question of relative force, must it be inferred that small works are suited to all circumstances. We speak here in reference merely to the judgment we are entitled to form of the relative power of these antagonist forces from their contests as exhibited in history. In instances of the latter sort, there cannot, from the nature of the case, be any important influence operating of which we are ignorant, or for which we cannot make due allowances; while, in examples of the former kind, we may be in the dark as to many vital matters.

These observations have been deemed necessary, because, in judging of this matter, it might not be so obvious that certain brilliant and striking results should not be adopted as affording the true test of relative power. It would be more natural to turn to Copenhagen and Algiers, as indicating where the power lies, than to Charleston and Stonington; and yet these latter, as indices, would be true, and the former false.

We will now turn to certain examples:

"The name of Martello tower was adopted in consequence of the good defence made by a small round tower in the Bay of Martello, in Corsica, in the year 1794, which, although armed with one heavy gun only, beat off one or two British ships-of-war without sustaining any material injury from their fire. But this circumstance ought merely to have proved the superiority which guns on shore must always, in certain situations, possess over those of shipping, no matter whether the former are mounted on a tower or not. That this is a just decision will perhaps be readily allowed by all who are acquainted with the following equally remarkable, but less generally known fact, which occurred about twelve years afterwards in the same part of the world."*

"Sir Sidney Smith, in the Pompée, an eighty-gun ship, the Hydra, of thirty-eight guns, Captain Manby, and another frigate, anchored about eight hundred yards from a battery of two guns, situated on the extremity of Cape Licosa, and protected from assault by a tower in which were five and twenty French soldiers, commanded by a lieutenant.

"The line-of-battle ship and the frigates fired successive broadsides till their ammunition was nearly expended; the battery continually replying with a slow but destructive effect. The Pompée, at which ship alone it directed its fire, had forty shot in her hull; her mizen topmast carried away; a lieutenant, midshipman, and five men killed, and thirty men wounded. At length force proving ineffectual, negotiation was resorted to, and after some hours' parley, the officer,

* Pasley's Course, vol. iii.

a Corsican, and relative of Napoleon, capitulated. It then appeared that the carriage of one of the two guns had failed on the second shot, and the gun had subsequently been fired lying on the sill of the embrazure; so that in fact the attack of an eighty-gun ship and two frigates had been resisted by a single piece of ordnance."—(Journal of Sieges, by Colonel John T. Jones.)

"The Corsican tower above mentioned, which had, in like manner, completely baffled a naval cannonade, was very soon found to surrender when attacked by land; not, however, before a small battery had been made [erected] to reduce it."—(*Pasley's Course*, vol. iii.)

Here are two examples:

1st. A single heavy gun, mounted on a tower, beat off one or two British ships.

2d. A barbette battery, containing two guns, beat off a British eighty-gun ship supported by two frigates.

It would seem that no exception can possibly be taken to either instance, as trials of relative power. There is no complication of circumstances on one side or the other; nothing to confuse or mislead; all is perfectly simple and plain. A small body of artillery, judiciously posted on the shore, is attacked by armed vessels bearing forty or fifty times as many guns; and the ships, unable to produce any effect in consequence, are beaten off with loss.

The cases present no peculiar advantage on the side of the batteries either as regards position or quality; for both works were immediately reduced by a land attack; that which the eighty-gun ship and two frigates were unable to effect, being immediately accomplished by landing two field-pieces, with a very small portion of the crew of one of the vessels.

On the other hand, there was no peculiar disadvantage on the part of the ships, as the time and mode of attack were of their own choice.

In order that there might be no unjust disparagement of the vessels, in the manner of representing the affairs, the language of British military writers (the ships being British) has been exactly quoted.—(See Pasley's Course of Elementary Fortifications, vol. ii., and Journal of Sieges, by Colonel John T. Jones.)

Had the representation of these actions been taken from the victorious party, the result would have appeared still more to the disadvantage of the ships.

The circumstances attending the attack and defence of Copenhagen, in April, 1801, seem to have been the following:

On the northeast side of the city (the only side exposed to attack from heavy ships) there lies a shoal spreading outward from the walls, about three-quarters of a mile in the narrowest part. Through this shoal there runs, in a northeast and by north direction, a narrow channel connecting the basin, in the heart of the city, with deep water. Were it not for this shoal, vessels might approach even to the walls of the city, on a length of about one and a half mile; as it is, they can get no nearer, in any place, than about three-quarters of a mile, without following the channel just mentioned. As the edge of the shoal lies nearly north and south, and the channel passes through it in a northeast-by-north direction, the great mass of the shoal is to the southward, or on the right hand side of the channel. We will call this the southern shoal. The "Three-crown battery" is situated upon this southern shoal and near the channel.

The Danish defences consisted—

1st. Of the fortifications on this side of the city, including the Three-crown battery; Nelson estimated the batteries supporting the Danish vessels at about ninety guns.

2d. Of four sail of the line, mounting 282 guns, and one frigate and two sloops, mounting 76 guns; making 358 guns. All these vessels lying in the channel before mentioned, and some of them near its mouth; they constituted the left of the Danish floating defences, and were thus posted to defend the entrance to the inner harbor or basin.

3d. Of a line of floating defences, of various kinds, moored near the edge of the

southern shoal. They were eighteen in number, as follows, counting from the right or southern extremity: 1st, a block-ship of 56 guns; 2d, a block-ship of 48 guns; 3d, a praam of 20 guns; 4th, a praam of 20 guns; 5th, a block-ship of 48 guns; 6th, a raft of 20 guns; 7th, a block-ship of 22 guns; 8th, a raft of 20 guns; 9th, a block-ship of 62 guns; 10th, a small vessel of 6 guns; 11th, a raft of 24 guns; 12th, a praam of 20 guns; 13th, a ship of the line of 74 guns; 14th, a block-ship of 26 guns; 15th, a raft of 18 guns; 16th, a ship of the line of 60 guns; 17th, a block-ship of 64 guns; 18th, a "frigate" of 20 guns; total in this line 628 guns. These vessels were moored in a line extending south from a point outside and a little to the southward of the Three-crown battery; and the part of the line nearest the walls was not less than three-quarters of a mile distant.

Lord Nelson carried to the attack the Elephant, 74 guns; Defiance, 74; Monarch, 74; Bellona, 74; Edgar, 74; Russell, 74; Ganges, 74; Glutton, 54; Isis, 50; Agamemnon, 64; Polyphemus, 74; Ardent, 64; Amazon, 38; Desirée, 38; Blanche, 36; Alcmene, 32; Dart, 30; Arrow, 18; Cruiser, 18; Harpy, 18; Zephyr, 14; Otter, 14; Discovery, 16; Sulphur, 10; Hecla, 10; Explosion, 8; Zebra, 16; Terror, 10; Volcano, 8; making a total of 1,074 guns, besides a few in gunboats. The Agamemnon did not get into action; which reduces the force employed to 1,010 guns. The Bellona and Russell grounded; but Lord Nelson says, "although not in the situation assigned them, yet they were so placed as to be of good service."

With this force Lord Nelson engaged the line of floating defences that was moored near the edge of the southern shoal. He approached from the south, with a fair wind; and as his leading vessel got abreast of the most southern of the Danish line she anchored by the stern. The second English vessel passed on until she had reached the next position, when she anchored, also, in the same way; and thus, inverting his line as he extended it, he brought his whole force against the outer and southern part of the Danish force. His line did not reach as far northward as the Three-crown battery, and mouth of the channel; for, he says, in speaking of the grounding of the Bellona, Russell, and Agamemnon: "These accidents prevented the extension of our line by the three ships before mentioned, who would, I am confident, have silenced the Crown islands, (Three-crown battery,) the outer ships in the harbor's mouth, and prevented the heavy loss in the Defiance and Monarch."

Concentrating, as he did, the force of 1,010 guns upon a portion of the Danish array, not only inferior to him by 382 guns, but so situated as to be beyond the scope of succor, and without a chance of escape, Lord Nelson had no reason to doubt that signal success would crown his able arrangement. Every vessel in this outer Danish line was taken or destroyed, except one or two smaller vessels, which cut and ran in under shelter of the fortifications.

The vessels lying in the narrow channel could participate in no material degree in the action, because the British line did not reach abreast of them; and because, not being advanced beyond the general direction of the Danish line, but, on the contrary, retired behind it, they could not act upon any of the British vessels, except, perhaps, obliquely upon two or three of the most northern ships. But had all the Danish vessels that were lying in the narrow channel been mingled, from the first, with the line that was destroyed, the result would probably have been still more to the advantage of the assailants; that is to say, these vessels, also, would have been captured or destroyed; because, not only would the aggregate Danish force of 986 guns have been inferior to the 1,010 guns of the British, but it would also have been without the ability to counteract the power of concentration possessed by the latter, whereby the whole force would have acted on parts of the Danish line in succession.

For the same reason that the squadron which lay in the narrow channel could not materially aid in resisting the attack made on the line of floating defences

anchored along the edge of the shoal, the action of the Three-crown battery, and the guns on the shore must have been greatly restricted. Situated *upon the shoal*, the Three-crown battery was *behind* the Danish line, which consequently masked it, and also the shore batteries, from a view of the English line. Under such circumstances it is not conceivable that the batteries could be used with effect; and the commander of the Danish forces says expressly that the Three-crown battery "*did not come at all into action;*" and a chronicler of the times states that the fortifications of the town "*were of no service while the action lasted; they began to fire when the enemy took possession of the abandoned ships, but it was at the same time that the parley appeared.*" In proportion as the Danish vessels passed into the hands of the English, as some were burnt, and others blown up, the scope of the batteries would enlarge, and their power be felt; but just as all impediment of this sort had been removed, Lord Nelson himself proposed the cessation of hostilities, and the action ceased. It might be profitable to discuss the probable consequences of a continuance of the action, to inquire why it was that Lord Nelson, after he had conquered two-thirds of the 986 floating guns opposed to him, did not pursue his advantage, and concentrate his 1,010 guns upon the 358 guns, which were all that remained of the floating defences of the Danes, especially as the wind was in favor of such a manœuvre. But having already devoted too much space to this particular contest, we will suppose some dictate of policy, perhaps of humanity, induced him to close the contest, relying on the severe blow he had already inflicted, and the commanding tone it enabled him to assume for such a termination of the pending negotiation as the interest or policy of Great Britain demanded.

It is important, however, yet to notice that, as soon as the negotiation opened, Lord Nelson's vessels passed out of the reach of the Three-crown battery as fast as they could be withdrawn. Lord Nelson himself states that this battery was not silenced.

A British writer, speaking of this crisis, says: "It must not, however, be concealed that Lord Nelson, at the time he dictated this note to the Dane, was placed in rather awkward and difficult circumstances; the principal batteries, as well as the ships which were stationed at the mouth of the harbor, were still unconquered; two of his own vessels were aground, and exposed to a heavy fire; others, if the battle continued, might be exposed to a similar fate; while he found it would be scarcely practicable to bring off the prizes under the fire of the batteries. These considerations, undoubtedly, influenced him in resolving to endeavor to put a stop to hostilities, in addition to the instructions he had to spare the Danes, and the respect he might have felt for their brave defence."—(Campbell's Naval History, vol. vii, p. 203.)

The circumstances above detailed show clearly:

1st. That the battle of Copenhagen was fought between an English fleet mounting 1,010 guns, and a Danish line of floating defences, mounting 628 guns; and that all the latter were conquered.

2d. That the Danish line was attacked in such a manner that none of the fixed batteries in the system of defence could participate in the contest, which was carried on up to the surrender of the Danish line, almost exclusively between vessels. It appears that a few of the smaller vessels, under Captain Riou, occupying the northern extremity of the English line, were under the fire of the Three-crown battery. The loss being very severe, he was obliged to retreat.

3d. That as soon as the batteries were unmasked and began to act the battle was closed, by Lord Nelson opening a parley.

4th. That, consequently, it was in no sense a contest between ships and batteries, or a triumph of ships over batteries, and affords no ground for judging of their relative power.

5th. That it illustrates, strikingly, the advantage that a fleet possesses over a stationary line of floating defences. Lord Nelson was superior to the whole of

his adversary's floating force; but not being disposed to run any unnecessary hazard he directed all his force upon a part of the Danish line, which was, of course, defeated; and had there been no other than a floating force present, so of course would have been the remainder, had it been of twice the strength it was. This example fully confirms what we have before urged on this topic.

In estimating the respective forces above, we have set down the vessels of both parties at their rate: that is to say, a ship called a seventy-four we have reckoned at 74 guns.

We now proceed to examine a great instance of naval success, in which there is no room to doubt the extent to which fortifications were engaged; this instance is the attack on Algiers in 1816.

The attack was made by the combined English and Dutch fleets, mounting about one thousand guns, under the command of Lord Exmouth.

In the fortifications that looked towards the water, there are enumerated in a plan, supposed to be authentic, 320 guns; but not more than 200 of these could act upon the fleet as it lay. The ratio of the forces engaged, therefore, as expressed by the number of guns, (saying nothing of the calibres, of which we know nothing,) was about as 5 to 2. The action continued from a quarter before three until nine, without intermission, and did not cease altogether until half-past eleven.

It is very certain that the effects of the fire upon the Algerine shipping and town were very severe, because we know that all the shipping was destroyed, excepting some small vessels; and we know also that Lord Exmouth dictated the terms of the treaty that followed.

Honorable as this result was to the combined fleets, and happy as it was for the cause of humanity, there are, nevertheless, technical circumstances connected with it that excite doubts as to how much of the final result was due to physical chastisement, to moral effect, to inherent defects in the defences, and to ignorance in the use of these defences, such as they were. That the loss in killed and wounded in the city and works was great is probable, because we are informed that a very great addition had been made to the garrison, in preparation for the attack, under some impression, no doubt, that a landing would be attempted. For the service of the guns there were needed but 3,000 or 4,000 men, at the utmost. An accumulation beyond that number would add nothing to the vigor of defence, while, by causing an increase of the casualties, it would heighten the terrors of the combat. The depressing effect of this loss of life in the batteries, and of the burning of buildings within the town and about the mole, was of course increased by the entire destruction of the Algerine fleet, anchored within the mole.

We have no means of judging of the actual condition of the works; nor of their fitness for the task of contending with the heavy ships of modern times.

The forts and batteries on the shore were probably too elevated to be commanded even by the largest of the assailing ships; and, provided these guns were covered with a proof parapet, they may be regarded as being well situated.

But more than half of the guns engaged were in the Mole-head battery; and the mode of attack adopted, especially by the Queen Charlotte, of 110 guns, was calculated to test, in the severest manner, the principles on which this work had been planned. She so placed herself within "fifty yards" of the extremity of this battery, that she could either rake or take in reverse every part of it. If she, at the same time, commanded the battery—that is to say, if, from her spar deck, she could look down upon its platform—then she must at once, with her grape and canister, have driven the garrison from that platform, leaving only the lower and covered tier of guns, if there were such a tier, for service. With our imperfect knowledge of the fortifications, all this must, however, be left to conjecture.

But there are matters connected with the service of the batteries which are not conjecture. Not a shot was fired until the Queen Charlotte had anchored.

What a different vessel, when she anchored, might not this ship have been, if the Mole-head battery had employed its fire of more than 100 guns in raking her, from the time she arrived within a mile and a half until she had anchored within fifty yards? How different might have been the condition of the fleet generally, if they had been subjected, during the approach, and while assuming their stations, to the raking fire of all the 200 guns?

It does not appear that a single hot shot was fired from the batteries.

We might almost rest on this fact, and assert that a defence which had failed to provide itself with this auxiliary means, must have been carried on in disregard, if not in violation, of all rules, all knowledge, and all experience; that it was probably without plan or combination, and, not less probable, without preparation in other particulars of importance scarcely inferior.

Before leaving this example it may be well to inquire what, after all, was the effect of these batteries upon the ships, compared with the effect of ships upon ships.

In the battle of the Nile, the French fleet, rated at 1,190 guns, caused a loss in Nelson's fleet of 895 killed and wounded; which is in the proportion of ten French guns to less than eight Englishmen killed and wounded. In the battle of Trafalgar the French fleet carried not less than 3,000 guns, and they caused a loss to the English of 1,587 killed and wounded; which is in the proportion of ten guns to less than six killed and wounded. In this affair of Algiers, with a force not exceeding 200 guns, the batteries caused a loss of 883 killed and wounded, being in the proportion of 10 guns to 44 men; and, if we take into account every gun that was pointed upon the bay, (say 350 guns,) the proportion will be 10 guns to 25 men; being an effect more than three times as great as that produced by the French ships at the battle of the Nile, and more than four times as great as that produced by the ships of the same nation at Trafalgar.

While reflecting on the circumstances of this battle the mind is not satisfied with any reasons that present themselves for the withdrawal of Lord Exmouth the moment the land wind enabled him to do so. On the supposition of entire success on his part, it is not understood why he should feel the great anxiety he states himself to have been under that this wind should spring up. "Providence at this interval," (between 10 and 11 at night,) "gave to my anxious wishes the usual land wind, common in this bay; and my expectations were completed. We were all hands employed warping and towing off, and, by the help of the light air, the whole were under sail, and came to anchor out of the reach of shells about two in the morning, after twelve hours of incessant labor."

Now, if anything had been decided by the action, it must have been one of two things: either the ships were victorious, or the batteries were so. If the ships were completely victorious, it would seem to have been judicious for them to remain where they were, in order, if there was to be any more fighting, to be ready to press their advantage; and, especially, in order to maintain the ascendency, by preventing the remounting of guns, repairing of batteries, and resupplying them munitions, &c.

Had the people possessed the inflexibility report ascribed to the Dey, and had they set zealously about the work of preparation for a new contest, it might not have been easy for Lord Exmouth, in the condition to which his ships are acknowledged, by authentic accounts, to have been reduced, to enforce his demands. It is not understood, therefore, why, if he had been so successful as to be certain that his end was attained, he should be so anxious to get out of gunshot, when, by so doing, he involved the issue in more or less doubt and hazard.

He relied on the effects produced on the people by his dreadful cannonade, and the result proves that he was right; but his anxiety to clear the vessels

from the contest shows that there was a power still unconquered, which he thought it better to leave to be restrained by the suffering population of the city, than keep in a state of exasperation and activity by his presence. What was this power but an unsubdued energy in the batteries?

The true solution of the question is, then, not so much the amount of injury done on the one side or the other—particularly as there was, on the one side, a city to suffer, as well as the batteries—as the relative efficiency of the parties when the battle closed at about eleven o'clock. All political agitation and popular clamor aside, what would have been the result had the fight been continued, or even had Lord Exmouth renewed it next morning?

These are questions that can be answered only on conjecture; but the manner the battle ended certainly leaves room for many doubts whether, had the subsequent demands of Lord Exmouth been rejected, he had it in his power to enforce them by his ships: whether, indeed, if he had renewed the fight, he would not have been signally defeated.

On the whole, we do not think that this battle, although it stands preeminent as an example of naval success over batteries, presents any arguments to shake the confidence which fortifications, well situated, well planned, and well fought, deserve, as the defences of a seaboard.

GIBRALTAR.

The attack on the water batteries of Gibraltar in September, 1782, by the French and Spanish floating batteries, is a well known instance of the power of guns on shore.

These floating batteries had been rendered, as was supposed, shot-proof and shell-proof, by several additional thicknesses of timber to the sides, and by covering the decks with a roof of sloping timbers.

They mounted 142 guns on the engaged side, with 70 in reserve to replace any that might be dismounted. They were anchored at the distance of about 1,000 yards from the walls, and were opposed by about 85 guns.

After a protracted cannonade, nine of the floating batteries were burnt by hot shot from the shore, and the tenth, having been taken possession of by the victors, was set on fire by them.

No material injury was done to the works of the town by their fire; and only eighty-five men and officers were killed and wounded by the fire from these vessels, together with a very violent cannonade and bombardment from the siege batteries.

BATTLE OF ALGESIRAS.

On the 6th July, 1801, the French Admiral Lenois was lying at anchor off the town of Algesiras with two ships of 80 guns, one of 74 guns, and one frigate. To the south of him, on a small island, was a battery called the Green Island battery, mounting seven 18 and 24-pounders; and to the north of him, on the main, another battery called St. Jaques's battery, mounting five 18-pounders. There were, besides, fourteen Spanish gunboats anchored near, making a total of 306 guns afloat and 12 guns in battery—altogether, 318 guns.

Sir James Saumarez, hearing that Lenois was in this position, advanced against him from Cadiz with two ships of 80 guns, four of 74 guns, one frigate, and a lugger—in all, 502 guns. On his approach, Lenois, who was anchored in a line nearly north and south, at some distance from the shore, cut his cables and ran into shoal water, to prevent being doubled upon by the British line; this manœuvre, at the same time, entirely unmasked the fire of the batteries.

The Hannibal, one of the British 74's, in attempting to close with the French admiral, touched the ground and could not be floated off. She, however, con-

tinued the fight with great obstinacy, even for a considerable time after she was deserted by her consorts. Not being able to double upon the French line, an attempt was made to assault the Green Isle battery, which, being badly served by the Spaniards, had nearly ceased firing. But this attempt was anticipated by the arrival at the island of a party sent from the French frigate lying near, and the assault was defeated, with the loss to the English of one boat sunk and another taken, the Frenchmen renewing with vigor the fire of the battery. At the north end of the line the French admiral was aided by seven gunboats, which took so active a part in the fight that five of them were sunk or rendered unserviceable. The St. Jaques battery being, however, served sluggishly by the Spaniards, the French sent a party from the Dessaix to impart greater activity and effect.

After the combat had continued about six hours, the British squadron drew off greatly damaged, leaving the Hannibal 74 alone and aground; and she, after suffering great loss, was obliged to strike. The French insist that the Pompée, an English ship of 80 guns, had struck her colors, but, as they could not take possession, she drifted off and was then towed away; it is believed she was entirely dismasted.

We do not know the loss in the French squadron, but the killed, wounded, and missing in the English fleet amounted to 375 men, being more than twelve men for every ten guns against them, and being twice as great, in proportion, as the English loss in the battle of Trafalgar.

In this battle of Algesiras there were 502 English guns afloat, acting against 306 French guns afloat. As the English chose their own time for the attack, and had the wind, it is only reasonable to suppose that 306 of the English guns were a match for the 306 guns in the French vessels. This will leave 196 English guns afloat opposed to the 12 guns in the batteries, or, reckoning one side only of each ship, it shows 98 guns in the British fleet to have been overmatched by the twelve guns in the batteries.

There never was a more signal and complete discomfiture; and it will admit of no other explanation than that just given, namely, that the two small batteries, one of 5 and the other of 7 guns, partly 18 and partly 24-pounders, more than compensated for the difference in favor of the British fleet of 196 guns.

The Hannibal got aground, it is true, but she continued to use her guns with the best effect until she surrendered; and, even on the supposition that this ship was useless after she grounded, the British had still an excess of 122 guns over the French fleet and batteries.

These batteries were well placed, and probably well planned and constructed, but there was nothing extraordinary about them; their condition before the fight was complained of by Admiral Lenois; and they were badly fought in the early part of the action; still the 12 guns on shore were found to be more than equivalent for two seventy-fours and one frigate.

BATTLE OF FUENTERABIA.

This recent affair introduces steam batteries to our notice.

On the 11th July, 1836, six armed steamers, together with two British and several Spanish gunboats, attacked the little town of Fuenterabia. The place is surrounded only by an old wall; and two guns of small calibre, to which, on the evening of the attack, a third gun of larger calibre was added, formed the entire of its artillery. The squadron cannonaded this place during a whole day and effected absolutely nothing beyond unroofing and demolishing a few poor and paltry houses, not worth perhaps the ammunition wasted in the attack. What may have been the number of guns and weight of metal which the assailants brought is unknown; though the superiority, independent of the superior

weight of metal, must have been at least ten to one; but not the slightest military result was obtained.—(See United Service Journal, August, 1836, page 531.)

We will now turn to affairs of a similar character on our own coast.

In June, 1776, Sir Peter Parker, commanding a squadron of two ships of 50 guns, four of 28 guns, two of 20 guns, and a bomb-ketch—in all (according to their rate) 252 guns—attacked Fort Moultrie, in Charleston harbor, South Carolina.

It is stated that the fort mounted "about thirty pieces of heavy artillery." Three of the smaller vessels were aground for a time during the action; and one of them could not be floated off, and was in consequence burnt by the English. Deducting this vessel as not contributing to the attack, and supposing that the other two were engaged but half the time, the English force may be estimated at 200 guns; or, reckoning one broadside only, at 100 guns against 30 guns.

The English were defeated with great loss of life, and injury to the vessels; while the fort suffered in no material degree, and lost but 30 men. The killed and wounded in the squadron were reported by the commodore to be 205; being for every ten guns employed against them more than 68 men killed and wounded; a loss more than eleven times as great, in proportion to the opposing force, as the loss at the battle of Trafalgar.

In September, 1814, a squadron of small vessels, consisting of two ships and two brigs, mounting about 90 guns, attacked Fort Boyer, at the mouth of Mobile bay. A false attack was at the same time made by a party of marines, artillery, and Indians, on the land side. The fort was very small, and could not have mounted more than twenty guns on all sides, nor more than fifteen guns on the water fronts. The action continued between two and three hours, when one of the ships being so injured as to be unmanageable, drifted ashore under the guns, and was abandoned and burnt by the English; the other vessels retreated after suffering severely. There were ten men killed and wounded in the fort; the loss on the other part is not known.

The affair of Stonington during the last war affords another instance of successful defence by a battery. In this case there were only two guns, (eighteen-pounders,) in a battery which was only three feet high and without embrasures. The battery, being manned exclusively by citizen volunteers from the town, repelled a persevering attack of a sloop-of-war, causing serious loss and damage, but suffering none.

The only other instance we will adduce is that of the late attack on the castle of St. Juan de Ulloa. Having before us a plan of this work, made on the spot after the surrender, by a French engineer officer who was one of the expedition; having also his official account of the affair, as well as narratives by several eye-witnesses, we can fully understand the circumstances attending the operations, and are liable to no material errors.

On the 27th of November, 1838, Admiral Baudin anchored at the distance of about seven-eighths of a mile in a northeast direction from the castle, with the frigates La Néréide, of 52 guns, La Gloire, of 52 guns, and L'Iphigénie, of 60 guns, and, after being a short time in action, he was joined by La Créole, of 24 guns; in all, 188 guns, according to the rate of the ships. In a position nearly north from the castle, and at a distance of more than a mile, two bomb-ketches, carrying each two large mortars, were anchored. The wind being adverse, all the vessels were towed into position by two armed steamboats belonging to the squadron. "It was lucky for us," says the reporter, "that the Mexicans did not disturb this operation, which lasted near two hours, and that they permitted us to commence the fire." He further says: "We were exposed to the fire of one 24-pounder, five 16-pounders, seven 12-pounders, one 8-pounder, and five 18-pounder carronades—in all, 19 pieces *only*." In order the better to judge of of these batteries, we will convert them, in proportion to the weight of balls, into 24-pounders; and we find these 19 guns equivalent to less than 12 guns of that

calibre. But we must remark, that, although this simplifies the expression of force, it presents it greatly exaggerated; it represents, for example, three 8-pounders as equivalent to one 24-pounder; whereas, at the distance the parties were engaged, (an efficient distance for a 24-pounder,) the 8-pounders would be nearly harmless. It represents also the 18-pounder carronades as possessing each three-fourths the power of a long 24-pounder; whereas at that distance they would not be better than the 8-pounders, if so good. Although the above estimate of the force of the batteries is too great by full one-third, we will, nevertheless, let it stand as representing that force.

There were, then, twelve 24-pounders engaged against 94 guns (estimating for one broadside only of each ship) and 4 sea-mortars. During the action a shell caused the magazine in the cavalier to explode, whereby three of the nineteen guns were destroyed, reducing the force to about ten 24-pounders.

Considering the manner in which this work was defended, it would not have been surprising if the ships had prevailed by mere dint of their guns; but our author states, expressly, that though the accident just mentioned completely extinguished the fire of the cavalier, still "the greater part of the other pieces which could see the ships, to the number of sixteen, continued to fire till the end of the action." They were not dismounted, therefore, and the loss of life at them could not have been great. What, then, was the cause of the surrender of the castle?

Much has been said of the great use made by the ships of horizontal shells, or shells fired at low angles from large guns; and it is a prevailing idea that the work was torn to pieces, or greatly dilapidated by these missiles. This engineer officer states that, on visiting the castle after the cannonade, he found "it had been more injured by the French balls and shells than he had expected; still the casemates in the curtains, serving as barracks for the troops, were intact." "Of 187 guns found in the fort, 102 were still serviceable; 29 only had been dismounted by the French fire. The heaviest injury was sustained by the cavalier" (where a magazine exploded) "in bastion No. 2; in battery No. 5," (where another magazine was blown up,) "and the officers' quarters." They found in the castle twenty-five men whose wounds were too severe to permit their removal with the rest of the garrison.

Of the twenty-nine guns dismounted, five were thrown down with the cavalier; the remaining twenty-four guns were no doubt situated in parts of the work opposite to the attack, being pointed in other directions, and were struck by shots or shells that had passed over the walls facing the ships. There is reason to suppose that of the remaining sixteen guns pointed at the French, none were dismounted; and we know that most of them continued to fire till the end of the action.

The two explosions *may* certainly have been caused by shells fired at low angles from Paixhan guns. But it is much more likely they were caused by shells from the sea-mortars, because these last were much larger, and therefore more likely to break through the masonry; because, being fired at high angles, they would fall vertically upon the magazines, which were less protected on the top than on the sides; and because there were more of these large shells fired than of the small ones, in the ratio of 302 to 117.

But, considering that the cannonade and bombardment lasted about six hours, and that 8,250 shot and shells were fired by the French, it is extraordinary that there were no more than two explosions of magazines and that no greater injury was done the fort, since it is certain that there were no less than six other similar magazines situated on the rampart, in different parts of the work, not one of which was shell-proof. The surrender, after these explosions, was a very natural event, with a governor and garrison who seem to have known as little about the proper preparation for such contests as about the mode of conducting them. The second explosion must have satisfied them, if the first did

not, that they had introduced within their own precincts much more formidable means of destruction than any it was in the power of the French to send from gun or mortar.

The important points to be noticed in this contest are these:

1. The French took such a position that their 94 guns were opposed by the equivalent of 10 or 12 guns only.

2. In proof of the inefficiency of the Mexican guns generally, it may be stated that although the three French frigates were struck in their hulls about three hundred times, they lost but thirty-three men in killed and wounded. The Iphigénie was hulled 160 times, and yet had but thirteen men hurt. Very few, therefore, of these 160 balls could have passed through her sides.

3. It appears that very few, if any, of the guns exposed to the direct action of the French broadsides were dismounted or silenced by their fire.

4. The narratives of the day contain exaggerated statements of injury inflicted on the walls by shells fired from guns; the professional report, above quoted, of the chief engineer of the expedition, neither speaks of nor alludes to any such injury. After deducting from the parts of the work said to be most injured—the cavalier and also battery No. 5, in each of which a magazine exploded—there remain, as having suffered most, the quarters of the officers and bastion No. 2. As to the first, if it was elevated above the walls, as is probable, it would of course suffer severely, because the walls of mere barracks or quarters are never made of a thickness to resist shot or shells of any kind; and if not elevated above the walls, but covered by them, the injury resulted, most probably, from shells fired at high angles from the sea-mortars, and not from shells fired nearly horizontally from the Paixhan guns. Whether the injury sustained by bastion No. 2 was the effect of shot and shells upon the face of the walls, or of shells falling vertically within the bastion, is not stated. It was probably due in part to both. If there had been any extraordinary damage done by the horizontal shells, we may reasonably suppose special mention would have been made of it, because it was the first time that this missile had been tried, in a large way, in actual warfare. That anything like a breach could have been effected with solid shot, at that distance and in that time, we know to be impossible; but it is neither unreasonable to suppose, nor unlikely, that many of the heavy vertical shells may have fallen in the bastion and caused much injury. Whatever may have been the cause of the damage, or its amount, it did not, we have reason to believe, extinguish the fire of any of the five 16-pounders that were pointed from the bastion against the ships.

5. So far as effects were produced by the direct action of the French armament, whether guns, bomb-cannon, or sea-mortars, it does not appear that there was the slightest reason for the submission of the fort. There is little doubt that the 8,250 shot and shells fired at the castle must have greatly marred the surface of the walls, and it is not unlikely that three or four striking near each other may have made deep indentations, especially as the stone is soft, beyond any material applied to building in any part of the United States. But these are not injuries of material consequence, however they may appear to the inexperienced eye, and we should risk little in asserting that, abstracting the effects of the explosion, the castle was as inaccessible to assault after the cannonade as before it; that, so far as regards the levelling of obstacles lying in the way of a sword in hand attack, the 8,250 shot and shells might as well have been fired in the opposite direction.

6. The explosion, however, of two deposits of powder in the castle, one of which is reported to have buried sixty men in its ruins, showed the defenders that, although they might evade the vertical fire, and their works might cover them from the horizontal fire of the French, there was no protection against, no evasion of, the dreadful ravages of exploding magazines. With this ruin around them, and a sixfold greater ruin likely, at every moment, to burst upon their

heads, it is not surprising that a garrison, found in circumstances so unmilitary, doubted their power of protracted resistance.

7. It must be borne in mind that these explosions have nothing to do either with the question of relative strength or with the peculiarities of the French attack. No defences, with such management, can be effective, and no attack can fail. The French, not dreaming of such culpable, such inconceivable negligence on a point always receiving the most careful attention, entered upon the cannonade with no other purpose, as is avowed, than that of somewhat weakening the defences and dispiriting and fatiguing the garrison, before proceeding to an assault, which was to have followed at night, and for which all preparations had been made. Had the Mexicans thrown all the powder of these eight magazines into the sea, or had they transported it to their barracks, and every man, making a pillow of a keg, slept through the whole cannonade, as might have been done safely, in their quarters in the curtain casemates, the castle of St. Juan de Ulloa would, we doubt not, have been as competent to resist the projected assault as it was when the French first arrived before it.

8. The number of killed and wounded in the French vessels, in proportion to the guns acting against them was, for ten guns, more than twenty-seven men, being upwards of four times as great as the loss sustained by the English at the battle of Trafalgar.

In concluding this reference to facts in military history, we will add that we do not see how it is possible to avoid making the following deduction, namely: that fixed batteries upon the shore are capable of resisting the attacks of ships, even when the armament of the latter is by far the most numerous and heavy.

There are several reasons for this capacity in batteries, of which the principal may be thus stated; and these reasons apply to vessels of every size and every sort, to small or large, to vessels moved by wind or steam. The ship is everywhere equally vulnerable, and, large as is her hull, the men and the guns are very much concentrated within her; on the other hand, in the properly constructed battery it is only the gun itself, a small part of the carriage, and now and then a head or an arm raised above the parapet that can be hurt, the ratio of the exposed surfaces being not less than fifteen or twenty to one. Next, there is always more or less motion in the water, so that the ship-gun, although it may have been pointed accurately at one moment, at the next will be thrown entirely away from the object, even when the motion in the vessel is too small to be otherwise noticed; whereas, in the battery the gun will be fired just as it is pointed, and the motion of the ship will merely vary to the extent of a few inches, or at most two or three feet, the spot in which the shot is to be received. In the ship there are, besides, many points exposed that may be called vital points; by losing her rudder, or portions of her rigging, or of her spars, she may become unmanageable and unable to use her strength; she may receive shots under water and be liable to sink; she may receive hot shot and be set on fire; and these damages are in addition to those of having her guns dismounted and her people killed by the shot which pierce her sides and scatter splinters from her timbers, while the risks of the battery are confined to those mentioned above, namely, the risk that the gun, the carriage, or the men may be struck. That the magazines should be exposed, as were those of the castle St. Juan de Ulloa, must never be anticipated as possible.

While on this part of our subject, it is proper to advert to the use of horizontal shells, or hollow shot, or Paixhan's shells, (as they are variously called,) it having been argued that the introduction of these missiles is seriously to impair the utility of fortifications as a defence of the sea-coast.

We fully believe that the free use of these shells will have an influence of some importance on the relative force of ship and battery, but that influence must be the very reverse of such predictions. How are the batteries to be affected by them? It can be but in two ways: first, the ship-gun having been

pointed so as to strike a vital point—that is to say, a gun or a carriage—the shell may explode at the instant of contact. This explosion may possibly happen thus opportunely, but it would happen against all chances, and if happening, would probably do no more than add a few men to the list of killed and wounded. For reasons that will soon appear, it is to be doubted whether the probability of dismounting the gun would be so great as if the missile were a solid 32-pounder shot. Secondly, if it be not by dismounting the guns or killing the garrison, the effects anticipated from these missiles must result from the injury they do the battery itself. Now, we are perfectly informed by military experience as to the effects of these shells upon forts and batteries, for the shells are not new, although the guns may be so—the 8-inch and the 10-inch shells having always been supplied in abundance to every siege-train, and being perfectly understood, both as to their effects and the mode of using them.

Were it a thing easily done, the blowing away of the parapets of a work, (a very desirable result to the attacking party,) would be a common incident in the attacks of fortifications; but the history of attacks by land or water affords no such instance. The only practicable way yet discovered of demolishing a fortification being by attaching a miner to the foot of the wall, or by dint of solid shot and heavy charges fired unremittingly during a long succession of hours upon the same part of the wall, in order not only to break through it, but to break through it in such a manner that the weight and pressure of the incumbent mass may throw large portions of the wall prostrate. This, the shortest and best way of breaching a wall, requires, in the first place, perfect accuracy of direction, because the same number of shots that, being distributed over the expanse of a wall, would merely peel off the face, would, if concentrated in a single deep cut, cause the wall to fall; and it requires, moreover, great power of penetration in the missile—the charge of a breaching-gun being for that reason one-third greater than the common service charges. Now, the requisite precision of firing for this effect is wholly unattainable in vessels, whether the shot be solid or hollow; and if it were attainable, hollow shot would be entirely useless for the purpose, because *every one of them would break to pieces against the wall*, even when fired with a charge much less than the common service charge. This is no newly-discovered fact; it is neither new nor doubtful. Every hollow shot thrown against the wall of fort or battery, if fired with a velocity affording any penetration, will unquestionably be broken into fragments by the shock.

After so much had been said about the effect of these shells upon the castle of St. Juan de Ulloa, it was deemed advisable, although the result of European experiments were perfectly well known, to repeat in our own service some trials touching this point. A target was therefore constructed, having one-third part of the length formed of granite, one-third of bricks, and the remaining third of freestone. This was fired at by a Paixhan gun and by a 32-pounder from the distance of half a mile, and the anticipated results were obtained, namely:

1st. Whether it was the granite, the brick, or the freestone that was struck, the solid 32-pounder shot penetrated much deeper into the wall, and did much more damage than the 8-inch hollow shot; and—

2d. These last broke against the wall in every instance that the charge of the gun was sufficient to give them any penetration.

The rupture of the shell may often cause the explosion of the powder it contains, because the shell, the burning fuse, and the powder are all crushed up together; but the shell having no penetration, no greater injury will be done to the wall by the explosion than would be caused by the bursting of a shell that had been placed against it.

From all this it appears, incontrovertibly, that, as regards the effects to be produced upon batteries by ships, solid shot are decidedly preferable to hollow shot; and the ship that, contemplating the destruction of batteries, should change any of her long 24 or 32-pounder guns for Paixhan guns would certainly

weaken her armament. Her best missiles, at ordinary distances, are solid shot; and, if she can get near, grape shot to fire into the embrasures and over the walls. The best shells against batteries are the sea-mortar shells, fired at high elevations; which, being of great weight and falling from a great height, penetrate deeply, and containing a considerable quantity of powder cause material ravage by their explosion. Such shells, however, can only be fired by vessels appropriately fitted.

The use of these same hollow shot by batteries against vessels is, however, an affair of different character. The shells do not break against timber, but penetrating the bulwarks they, in the first place, would do greater damage than hollow shot, by making a larger hole and dispersing more splinters; and having, as shot, effected all this injury, they would then augment it many fold by exploding.

In all cases of close action between ship and battery, the shells will pass through the nearer side, and if not arrested by some object on the deck, will probably lodge and explode in the further side; causing, by the explosion, a much greater loss among the crew, and greater injury to the vessel, than by their mere transit across the vessel. As before suggested, the vessel would suffer less injury were her sides made so thin as not to retain the shell, permitting it to pass through both sides, unless fired with a small velocity. It is not impossible that an extensive use of these horizontal shells may lead to a reduction in the thickness of ships' bulwarks.

In the facts quoted above, there is no illustration of the effects of hot shot, except in the case of Gibraltar. In that attack the floating batteries were made proof against cold shot, and, as was thought by the constructor, proof against hot shot also; and so, indeed, for a time, it seemed. It was conceived that the hot shot, when buried deep in the closely-jointed timbers, would scarcely communicate flame; and that it would not be difficult, by the use of the fire-engines provided, to subdue so stifled a combustion.

By making these floating batteries impenetrable to shot, it was supposed they had been rendered equal, in perfectly smooth water, to land batteries, gun for gun; and so they might then have been, nearly, had the incombustibility of the latter been imparted to them. But now resistance to fire would not suffice: these floating batteries must either repel these horizontal shells from their bulwarks, or, if that be impossible, permit them to pass through both sides. Nothing can be better calculated to exhibit the tremendous effects of these shells than a vessel so thick-sided as to stop every shell, allowing it to burst when surrounded by several feet of timber; and there can be no greater mistake than supposing that by thickening the bulwarks of vessels-of-war, or fitting up steam batteries with shot-proof sides, the effects of land batteries are to be annulled, or in any material degree modified.

We will sum up this branch of our subject with the remark that the facts of history, and the practice of all warlike nations, are in perfect accordance with the conclusions of theory. The results that reason anticipated have occurred again and again. And so long as, on the one side, batteries are formed of earth and stone; and, on the other, ships are liable to be swallowed up by the element on which they float, or to be deprived of the means by which they move; so long as they can be penetrated by solid shot, set on fire or blown up by hot shot, or torn piecemeal by shells, the same results must, inevitably, be repeated at each succeeding trial.

But, after all, it may be urged that the general principle herein contended for, namely, the superiority of batteries in a contest with ships, might be admitted; and still it would remain to show that batteries constitute the kind of defence best adapted to our peculiar wants. This is true; and we will now proceed to consider, severally, the cases to which defence must be applied.

It may be well, however, first to recall the general scope of the preceding

argument. It has been contended that floating defences should not be relied on, not because they are actually incompetent to the duty, but because they cannot fulfil this duty unless provided in inordinate numbers, and at a boundless expense; and we have endeavored to show that this remark is generally true, whether the defensive fleet be made up of sea-going vessels, of floating batteries, or of steam batteries. We have next urged the point that properly planned and constructed batteries are an overmatch for vessels-of-war, even when greatly inferior to them in armament—sustaining our opinion by many striking examples, and explaining satisfactorily the only instances that have cast any doubt on such contests. If the facts and reasonings we have presented do not convey the same strong convictions that sway our own minds, it must be because we have obscured rather than illustrated them; for it would seem to be impossible that facts could be more unexceptionable, or reasons more beyond the reach of cavil. However that may be, we now leave them to candid and dispassionate revisal, and proceed to examine the mode of applying these defences to our own coast.

It may be well to divide these into several distinct classes:

1. There will be all the smaller towns upon the coast, constituting a very numerous class.

At the same time that no one of these, of itself, would provoke an enterprise of magnitude, it is still necessary to guard each and all against the lesser attacks. A small vessel might suffice to guard against single vessels that would otherwise be tempted by facility to burn the shipping and exact a contribution; but something more than this is necessary, since the amount of temptation held out by a number of these towns would be apt to induce operations on a larger scale. It might often happen, moreover, that our own vessels-of-war would be constrained to take refuge in these harbors, and they should find cover from the pursuer.

Although the harbors of which we now speak afford every variety of form and dimension, there are few, or none, wherein one or two small forts and batteries cannot be so placed as to command all the water that a ship-of-war can lie in, as well as the channel by which she must enter. While the circumstances of no two of them are so nearly alike as not to modify the defences to be applied to them severally, all should fulfil certain common conditions, namely: the passage into the harbors should be strongly commanded; the enemy should find no place, after passing, wherein he would be safe from shot and shells; and the works should be inaccessible to sudden escalade—that is to say, a small garrison should be able to repel such an assault. With works answering to these conditions, and of degrees of strength in accordance with the value of their respective trusts, this class of harbors may be regarded as secure. We cannot, however, here avoid asking what would be the mode of defence, if purely naval, of these harbors? Suppose the circumstances are deemed to require the presence of a frigate, or a steam frigate, or an equivalent in gunboats: would not *two* hostile frigates, or two steam frigates, infallibly arrive in quest? Could there be devised a system more certain to result in the capture of our vessels, and the submission of our towns?

2. Another class will consist of great establishments, such as large cities, naval depots, &c., situated in harbors not of too great extent to admit of good defence at the entrance, and also at every successive point; so that an enemy could find no spot within in which he could safely prepare for operations ulterior to the mere forcing an entrance.

In this class are to be found objects that are, in every sense, of the highest value. On the one hand, accumulations of military and naval material, and structures for naval accommodation, that could not be replaced during a war, which are of indispensable necessity, and of great cost; and, on the other hand, the untold wealth of great cities. As these objects must be great in the eyes of

the enemy—great for him to gain, and for us to lose—corresponding efforts on his part must be looked for and guarded against. If he come at all, it will be in power; and the preparations on our part must be commensurate.

The entrance to the harbor, and all the narrow passes within it, must be occupied with heavy batteries; and if nature does not afford all the positions deemed requisite, some must, if practicable, be formed artificially. Batteries should succeed each other along the channel, so that the enemy may nowhere find shelter from effective range of shot and shells while within the harbor, even should he succeed in passing the first batteries.

Provided the shores admit this disposition, and the defences be supplied with an armament, numerous, heavy, and selected with reference to the effects on shipping, the facts we have quoted from history show that these defences may be relied on.

If the mere passing under sail, with a leading wind and tide, one, or even two sets of batteries, and then carrying on operations out of the reach of these, or any other, were all, the enemy might perhaps accomplish it; but our present supposition is, that with this class his ulterior proceedings, and finally his return, are to be subject to the incessant action of the defences.

3. This brings us to consider a third class, consisting of establishments of importance situated at a distance up some river or bay, there being intermediate space too wide to be commanded from the shores. In such cases the defence must be concentrated upon the narrow passes, and must, of course, be apportioned in armament to the value of the objects covered. When the value is not very great, a stout array of batteries at the best positions would deter an enemy from an attempt to force the passage, since his advantage, in case of success, would not be commensurate with any imminent risk. But with the more valuable establishments it might be otherwise; the consequence of success might justify all the risk to be encountered in rapidly passing in face of batteries, however powerful. This condition of things requires peculiar precautions, under any system of defence. If, after having occupied the shores, in the narrow places, in the best manner, with batteries, we are of opinion that the temptation may induce the enemy, notwithstanding, to run the gauntlet, the obstruction of the passage must be resorted to. By this is not meant the permanent obstruction of the passage; such a resort, besides the great expense, might entail the ruin of the channel. The obstruction is meant to be the temporary closing by heavy floating masses.

There is no doubt that a double line of rafts, each raft being of large size and anchored with strong chains, would make it impossible to pass without first removing some of the obstructions, and it might clearly be made impossible to effect this removal under the fire of the batteries. Such obstructions need not be resorted to until the breaking out of a war, as they could then be speedily formed, should the preparation of the enemy be of a threatening nature.

There would be nothing in these obstructions inconsistent with our use of part of the channel, since two or three of the rafts might be kept out of line, ready to move into their places at an hour's notice.

The greatest danger to which these obstructions would be exposed would be from explosion vessels; and from these they might be protected by a boom, or a line of smaller rafts in front.

From what has just been said, it will be perceived that, when the inducements are such as to bring the enemy forward in great power, and efficient batteries can be established only at certain points, we are not then to rely on them exclusively. In such a case, the enemy should be stopped by some physical impediments; and the batteries must be strong enough to prevent his removing these impediments, and also to prevail in a cannonade, should the enemy undertake to silence the works.

The conditions these obstructions have to fulfil are these:

1st. They must be of a nature to be fixed readidy, and to be speedily removed when there is no longer occasion for them; and, to this end, they must be afloat.

2d. They must have adequate inertia to resist, or rather not to be destroyed or displaced by, the shock of the heaviest ship; and, in order to this, they must be held by the heaviest and strongest cables and anchors.

3d. They must be secure from the effects of explosive vessels; and, if in danger from this source, must be covered as above mentioned.

We do not say what are the exact circumstances in which all these conditions will be fulfilled, though we think the idea long ago presented by the board of engineers will, with modifications, embrace them all.

The idea is this: Suppose a line (extending across the channel) of rafts, separated from each other by a space less than the breadth of a ship-of-war, each raft being about 90 feet long, 30 feet wide, and 6 feet deep, formed of strong timbers, crossed and braced in all directions, and fastened together in the strongest manner. A long-scope chain cable is to proceed from each of the four corners, two obliquely up stream and two obliquely down stream, to very heavy anchors; and there should also be a very strong chain cable passing from one raft to another. Suppose a ship, striking one of the rafts, to break the chains leading down the stream: in doing this, she must lose much of her momentum. She has, then, "under her fore foot," the raft connected by a strong chain with the rafts to the right and left; on being tightened, this chain will throw the strain upon the down stream cable of that adjoining raft towards which the ship happens to tend. If we suppose it possible for these chains also to be parted by the power still remaining in the ship, or by impulses received from succeeding vessels, there will be other chains still to break in the same way. After the down stream chains are all parted, the rafts will "bring up" in a new position, (higher up the channel,) by the anchors that, in the first instance, were pointed up stream. Here a resistance, precisely like that first overcome, is to be encountered by vessels that have lost most of their force in breaking the successive chains, and in pushing these great masses of timber before them through the water. Should there exist a doubt as to the sufficiency of these remaining anchors and chains, or should it be deemed most prudent to leave nothing uncertain, a second similar line may be placed a short distance above the first.

The best proportions and dimensions of the rafts remain to be determined; but as there is scarcely a limit to the strength that may be given to the rafts themselves, and to the means by which they are to be held to their positions, and to each other, the success of a well arranged obstruction of this sort can hardly be doubted.

The expense would not be great in the first instance, and all the materials would be available for other purposes, when no longer needed for this.

It may be repeated here, that such expedients need not be resorted to, except to cover objects of the highest importance and value, such as would induce an enemy to risk a large expedition. For objects of less importance, batteries would afford ample protection. It will be remembered that this last power is, when once established in any position, a constant quantity; and, although it should be incompetent to effect decisive results when diffused over a large fleet, may be an overmatch for any small force upon which it should be concentrated. At the same time, therefore, that there is the less liability to heavy attacks, there will be, in the batteries, the greater capacity of resistance to others.

It must not be urged, as a reproach to fortifications, that, in the case we are considering, they are obliged to call in aid from other sources, so long as these aids are cheap, efficient, and of easy resort. By the mode we have suggested, the defence will undoubtedly be complete, every chance of success being on the side of the defence; that is to say, if any confidence is to be placed in the les-

sons of experience. How, on the other hand, will the same security be attained by naval means? Only, as before shown, by keeping within the harbor a fleet or squadron, or whatever it may be, which shall be at all times *superior* to the enemy.

In a naval defence there will be no advantage in obstructions of any sort, for there can be no lessening of the array of guns in consequence of such obstructions; because, if these obstructions are under the fire of the floating defences, the enemy will first subdue that fire, and then remove the obstructions at his leisure. If this fire prove too powerful for the enemy, the obstructions will have been unnecessary, and will serve only to shut up our own fleet, preventing the prompt pursuit of a beaten foe.

4. There is a fourth class, consisting of harbors, or rather bays or estuaries, of such expanse that batteries cannot be made to control the passage. These have been before spoken of. If the occupation of, or passage through these must be defended, it must be by other means than batteries upon the shore. The reliance must, from the nature of the case, be a floating defence, of magnitude at least equal to the force the enemy may bring. The complete defence of each of these bays would, therefore, involve very great expense; certainly, in most cases, greater than the advantages gained. The Chesapeake bay cannot, for instance, be shut against a fleet by fortifications; and if the entrance of the enemy is to be interdicted, it must be by the presence of a not inferior fleet of our own. Instead of such a system, it will be better to give up the bay to the enemy, confining our defences to the more important harbors and rivers that discharge into the bay. By this system, not only will these harbors be secure, but the defences will react upon the bay itself, and, at any rate, secure it from predatory incursions; because, while Hampton roads and the navy yard at Norfolk are well protected, no enemy would proceed up the bay with any less force than that which could be sent out from the navy yard.

In certain cases of broad waters, wherein an enemy's cruisers might desire to rendezvous in order to prosecute a blockade, or as a shelter in tempestuous weather, there may be positions from which sea-mortars can reach the whole anchorage, although nothing could be done with guns. A battery of sea-mortars, well secured from escalade, would, in such a case, afford a good defence, because no fleet will lie at anchor within the range of shells.

In thus distributing the various exposed points of the sea-coast into general classes, according to the most appropriate modes of defence, we do not find that anything can be substituted for fortifications, where fortifications are applicable, and we find them applicable in all the classes but the last; and in the last we shall find them indispensable as auxiliaries. In this last class there are, no doubt, some cases where naval means must constitute the active and operative force; and it is probable that steam batteries may, of all floating defences, be the most suitable.

It must not be forgotten, however, that the very qualities which recommend this particular kind of force will equally characterize the steam vessel of the enemy; nor must it be forgotten that, whether steam vessels or sailing vessels, or both, are relied on, unless there are well-secured points on the shore, under which they can take refuge, they will themselves constitute an object inviting the superior force of an enemy.

If, for example, we were to deem one of the open harbors of such importance as to assign eight or ten steam batteries for its protection, we should thereby place within reach of the enemy an object worthy of the efforts of a squadron, or twelve or fifteen vessels of the same description. Even, therefore, in the cases where naval means must be resorted to for defence upon the water, there should be works upon the shore behind which, if overpowered, they can retire.

It has been before remarked that the steam batteries are in no way more formidable to shore batteries than sailing vessels are: armed with Paixhan guns

they would be less so. And they would be less formidable, also, on account of their comparatively small number of guns; for there is no reason why the firing should be more accurate than from ships; and the chances of inflicting injury would be in proportion to the number of missiles.

The only material effect the introduction of this description of vessel can have upon a system of defence by fortifications is, that owing to their less draught of water, it will be necessary to secure channels that, not being navigable by vessels of the line and frigates, might otherwise be left unguarded. Some of these channels may have the draught of water lessened by an artificial ridge of stones, so as to be impracticable even to steam vessels; and this may often be done at small expense, and without detriment to the harbors; others will need additional fortifications. But the instances are not numerous where any such shallow channels exist.

In opposition to an opinion not uncommon, that modern improvements in steam vessels will tend to lessen the necessity for fortifications, we here see that the tendency is rather to increase their number.

Throughout this whole discussion the argument has turned on the relative efficiency of fixed and floating defences. The great relative economy of the former, we suppose, will be conceded. If not, we would ask; as conclusive, or at least as leading to calculation entirely satisfactory, that the following information be obtained from authentic sources, namely: the first cost, when complete in all respects, of the frigates United States, Constitution, and Congress, and also the entire expense of each of said vessels up to this time; specifying, as to each, the year of the several expenditures and the amounts thereof, under the heads, as far as practicable, of *first cost, repairs or rebuilding*, and *improvements and alterations;* and distinguishing—1st. The expense bestowed upon the hull. 2d. The expense bestowed upon the masts, spars, sails, anchors, cables and rigging. 3d. The expense bestowed upon the armament; and 4th. The expense bestowed upon all other matters, (as boats, ballast, tanks, paint, &c.,) necessarily connected with the preservation, or the ordinary service of the vessel.

Before we proceed to describe the several positions on the coast requiring fortifications, we have something still to say on the general subject, though on another branch. We now refer to the kind of fortifications, or rather to their magnitude and strength. That this particular topic should be embraced by our remarks is the more necessary since views hostile to the system of works now in progress have been urged from a high source.

The present system is founded on this principle, to wit: that the fortifications should be strong in proportion to the value of the objects to be secured. The principle will not, we suppose, be controverted, but only the mode of applying it.

There will hardly be a difference of opinion as to the mode of guarding the less important points. There being no great attraction to an enemy, works simple in their features, requiring small garrisons only, containing a moderate armament, but at the same time inaccessible to the dashing enterprises that ships can so easily land, and which can be persevered in for a few hours with much vigor, will suffice. Circumstances must, however, materially modify the properties of these works, even when the points to be guarded are of equal value. In one, the disadvantage of position must be compensated by greater power; in another, natural strength may need little aid from art; in another, greater width in the guarded channel may demand a larger armament; and in a fourth, peculiar exposure to land attack may exact more than usual inaccessibility. But all these varieties lie within limits that will probably be conceded.

As to the larger objects, it has been contended that there has been exaggeration in devising works to cover these, the works having been calculated for more formidable attacks than they will be exposed to. It is easy to utter vague

criticisms of this nature, and it is not easy to rebut them without going into an examination as minute as if the criticism were ever so precise and pertinent.

But let us look a little at the material facts. What is the object of an enemy? What are his means? What should be the nature of our defences?

The object may be to lay a great city under contribution, or to destroy one of our naval depots, or to take possession of one of our great harbors, &c. It was estimated that in the great fire in the city of New York, in the year 1835, the property destroyed within a few hours was worth upwards of seventeen millions of dollars, although the fire was confined to a very small part of the city, and did not touch the shipping. Is it easy, then, to estimate the loss that would accrue from the fires that a victorious enemy could kindle upon the circuit of that great city when no friendly hand could be raised to extinguish them? or is it easy to overrate the tribute such a city would pay for exemption from that calamity? Can we value too highly the pecuniary losses that the destruction of one of the great navy yards would involve, and the loss, beyond all pecuniary value, of stores and accommodations indispensable in a state of war, and that a state of war can hardly replace?

But what are the enemy's means? They consist of his whole sea-going force, which he concentrates for the sake of inflicting the blow. In the language of the critic: "From the nature of maritime operations, such a fleet could bring its whole strength to bear upon any particular position, and, by threatening or assailing various portions of the coast, either anticipate the tardy movements of troops upon land, and effect the object before their concentration, or render it necessary to keep in service a force far superior to that of the enemy, but so divided as to be inferior to it on any one point."

We have, then, objects of sufficient magnitude, and the means of the enemy consist in the concentration of his whole force upon one of these objects.

With the highest notion of the efficiency of fortifications against shipping, these are not cases where any stint in the defensive means are admissible. Having, therefore, under a full sense of the imminent danger to which the great objects upon the coast are exposed, applied to the approaches by water an array of obstacles worthy of confidence, we must carefully explore all the avenues by land, in order to guard against approaches that might be made on that side in order to evade or to capture the works guarding the channels. But before deciding on the defences necessary to resist these land attacks, it will be proper to estimate more particularly the means that an enemy may be expected to bring forward with a view to such land operations.

History furnishes many examples; and the expedition to Flushing, commonly called the Walcheren expedition, may be cited as peculiarly instructive.

From an early day Napoleon had applied himself to the creation of a maritime force in the Scheldt, and, in 1809, he had provided extensive dock yards and naval arsenals at Flushing and at Antwerp. On his invasion of Austria this year, he had drawn off the mass of his troops that had before kept jealous watch over these naval preparations, relying now on forts and batteries, and on the fortifications of Flushing and Antwerp, for the protection of the naval establishments, and of a fleet containing several line-of-battle ships and frigates, and a numerous flotilla of smaller vessels.

The great naval establishment at Flushing, near the mouth of the Scheldt, and of Antwerp, some sixty or seventy miles up the river, with the vessels afloat on the river or in progress in the yards, presented an object to England worthy of one of her great efforts.

The troops embarked on this expedition consisted of upwards of 33,000 infantry, 3,000 cavalry, more than 3,000 artillery, and some hundreds of sappers and miners—constituting an army of about 40,000 men. The naval portion consisted of 35 sail of the line, 23 frigates, 33 sloops-of-war, 28 gun, mortar, and bomb vessels, 36 smaller vessels, and 82 gunboats; making a total of 155 ships and other armed vessels and 82 gunboats. The guns, mortars, &c., pro-

vided for such bombardments and sieges as the troops might have to conduct amounted to 158 pieces, with the suitable supplies of ammunition and stores of every kind.

The idea of sailing right up to their object, in spite of the forts and batteries, seems not to have found favor, notwithstanding the power of the fleet. The plan of operations, therefore, contemplated the landing a portion of the army on the island of Walcheren, to carry on the siege of Flushing, while another portion proceeded up the Scheldt as high as Fort Bartz, which was to be taken, after which the army would push on by land about twenty miles further, and lay siege to Antwerp; all which, it was thought, might be accomplished in eighteen or twenty days from the first landing.

The execution did not accord with the design. Flushing, it is true, was reduced within fifteen days, and in less than a week from the debarcation (which was on the 31st of July) Fort Bartz was in possession of the English, having been abandoned by the garrison. But it was twenty-five days before the main body, with all necessary supplies for a siege, were assembled at this point and ready to take up the line of march against Antwerp. Since the first descent of the British matters had, however, greatly changed. The French were now in force; they had put their remaining defences in good condition; they had spread inundations over the face of the country; and not only would there be little chance of further success, but the safety of the expedition, formidable as it was, might have been compromised by a further advance. It was therefore decided in council to abandon the movement against Antwerp. The troops accordingly returned to the island of Walcheren, which they did not finally leave till the end of December.

The failure in the ultimate object of the expedition is to be ascribed to the omission to seize, in the first instance, the south shore of the river, and capture the batteries there, as was originally designed, and which was prevented by the difficulty of landing enough troops at any one debarcation, in the bad weather then prevailing. The capture of these batteries would have enabled the expedition to have reached Fort Bartz during the first week; and, in the then unprepared state of the French, the issue of a dash upon Antwerp can hardly be doubted.

The dreadful mortality that assailed the British army is wholly unconnected with the plans, conduct, or issue of the enterprise, as a military movement; unless, indeed, it may have frustrated a scheme for occupying the island of Walcheren as a position during the war.

Possession was held of the island for five months; and it was finally abandoned from no pressure upon it by the French, although, after the first six weeks, the British force consisted, in the aggregate, of less than 17,000 men; of which, for the greater part of the time, more than half were sick—effectives being often reduced below 5,000 men.

We see, therefore, that an effective force of less than 10,000 men maintained possession of the island, in the face of, and in close proximity to, the most formidable military power in Europe, for more than three months; and no reason can be perceived why it might not have remained an indefinite period, while possessed of naval superiority.

The proximity of England undoubtedly lessened the expense of the expedition, but it influenced the result in no other way material to the argument.

We will allude to no other instances of large expeditions sent by the English to distant countries, than the two expeditions, each of about 10,000 men, sent in the year 1814 against this country: one by the way of Canada, the other to the Gulf of Mexico. United in a single force of 20,000 men against our sea-coast, the expense would have been less, and the results more certain.

The French, notwithstanding their constant naval inferiority, have found opportunities to embark in great undertakings of the same nature. In 1802,

Leclerc proceeded to St. Domingo with 34 line-of-battle ships and large frigates, more than 20 small frigates and sloops, and upwards of 20,000 men.

We learn from these points in history what constitutes an object worthy of vast preparations; and it is impossible to resist the fact, that our own coast, and rivers, and bays, possess many establishments not less inviting to an enemy than Flushing and Antwerp.

We are taught, moreover, what constitutes a great expedition; in other words, what is the amount of force we must prepare to meet; and, more than all, we are taught that such an expedition, seizing a favorable moment, when the military arrangements of a country are incomplete—when the armies are absent, or imperfect in their organization or discipline—does not hesitate to land in the face of the most populous districts, and, availing of the local peculiarities, and covered and supplied by a fleet, to undertake operations which penetrate deep into the country, and consume considerable time.

It seems, therefore, that whenever the object we are to cover possesses a value likely to provoke the cupidity of an enemy, or to stimulate his desire to inflict a serious blow, it is not enough that the approaches by water are guarded against his ships; it will be indispensable to place safeguards against attacks by land also. A force considerable enough for very vigorous attacks against the land side of the fortifications may be thrown upon the shore; and if these yield, a way is opened for the ships, and the enemy carries his object.

In certain positions, the local circumstances would favor the land operations of an enemy; permitting him, while operating against the fortifications, to be aided by the fleet, and covered from the reaction of the general force of the country. In other positions, the extreme thinness of the population in the neighborhood would require the forts to rely, for a considerable time, on their own strength. In all such cases a much greater power of resistance would be requisite than in circumstances of an opposite nature. In all such circumstances the works should be of a strength adequate to resist an attack, although persevered in vigorously for several days. But when these land operations lead away from the shipping, or when the surrounding population is considerable, or the enemy is unable to shelter his movements by local peculiarities, then it will suffice if the works be competent to resist attacks, vigorous also, of a few hours only.

The magnitude and strength of the works will depend, therefore, on the joint influence of the value of the object covered, the natural strength of the position, and the succor to be drawn from the neighborhood. We may introduce, as instances, New York and Pensacola. The former is as attackable as the latter: that is to say, it equally requires artificial defences; and, owing to its capacious harbor and easy entrance, it is not easy to place it in a satisfactory condition as to the approaches by water. But while an enemy, in approaching any of the principal works by land, could not well cover himself from the attacks of the concentrated population of the vicinity, the rapid means of communication from the interior would daily bring great accessions to the defence. A land attack against the city must, consequently, be restricted to a few days; and the works will fulfil their object, if impregnable to a *coup de main*.

Pensacola, an object, in many respects, of the highest importance, and growing in consequence every day, is capable of being defended as perfectly as the city just mentioned. The principal defences lie on a long sandy island, which closes in the harbor from the sea. An enemy landed on this island (Santa Rosa) would be in uninterrupted communication with his fleet; could, owing to the sparseness of the population, have nothing to apprehend, for some time, from any re-enforcements arriving at the place; and would be well protected, by position, from the effects of this succor, when it should arrive. While in possession of naval superiority, he might, therefore, not unreasonably calculate on being able to press a siege of many days of the work which occupies the extremity of the island, and

guards the entrance to the harbor. And even before coming into possession of this work his gun and mortar batteries, on the same island, would destroy every thing not bomb-proof and incombustible at the navy yard. An attack not less persevering, and with equal chances of success, might be made from the other side of the harbor also.

If, therefore, the power to resist a *coup de main* be all that is conferred on the works at Pensacola, their object will be obtained only through the forbearance of the enemy; it being obviously indispensable that the principal of these works be competent to resist a short siege. If this liability resulted from the thinness of the neighboring population, it would still be many years before this state of things would be materially altered. But it does not depend on this alone; the peculiar topographical features will continue this liability in spite of increasing numbers, and ever so easy and rapid communication with the interior; it having been proved that a fleet may lie broad off this shore and hold daily communication therewith during the most tempestuous season. The English fleet of men-of-war and transports lay, during the last war, from the 7th of February to the 15th March, 1814, anchored abreast of Dauphin island and Mobile Point, where the exposure is the same as that off Pensacola.

Between the cases cited, which may be regarded as of the class of extreme cases, (a class comprising, however, many important positions,) almost every conceivable modification of the defence will be called for, to suit the various conditions of the several points.

The fortifications of the coast must therefore be competent to the double task of interdicting the passage of ships and resisting land attacks—two distinct and independent qualities. The first demands merely an array in suitable numbers and in proper proportions of heavy guns, covered by parapets proof against shot and shells; the second demands inaccessibility. As there is nothing in the first quality necessarily involving the last, it has often happened, either from the little value of the position, or from the supposed improbability of a land attack, or from the want of time to construct proper works, that this property of inaccessibility has been neglected.

Whenever we have an object of sufficient value to be covered by a battery, we should bear in mind that the enemy will know the value of the object as well as ourselves. That it is a very easy thing for him to land a party of men for an expedition of an hour or two; and, unless we take the necessary preventive measures, his party will be sure to take the battery first; after which, nothing will prevent his vessels consummating the design it was the purpose of the battery to prevent.

In general, the same fortifications that guard the water approaches will protect the avenues by land also, but in certain cases a force may be so landed as to evade the channel defences, reaching the object by a route entirely inland. Of course this danger must be guarded against by suitable works.

After the preceding exposition of our views on the general subject of the defences of the coast, it may not be out of place here to indicate the mode by which the system of fortifications on which we would rely can be manned and served without an augmentation for that particular purpose of the regular army.

The force that should be employed for this service in time of war is the militia, (using the term in a comprehensive sense;) the probability being that, in most of the defended points on the seabord, the uniformed and volunteer companies will supply the garrisons needed. And it may be shown that it is a service to which militia are better adapted than any other.

The prominent defect of a militia force results from the impossibility of so training the men to field movements in the brief period of their service as to give them any confidence in themselves as manœuvrers in the face of regular troops; the little they learn merely suffices to show them that it is but little;

every attempt of the kind proving, by the disorder that they know not how to avoid, how much greater would be the disorder if in face of an enemy and under fire.

Without the knowledge to be obtained only by long and laborious practice, the militiaman knows that he is no match in the field for the regular soldier, and it is not surprising that he should desire to avoid an encounter. But there is no such difficulty in the service of fixed batteries. The militiaman has to be taught merely the service of a single gun, than which nothing can be more simple. He must learn to use the rammer and the sponge, the handspike and the linstock, to load, and to run to battery, to trail and to fire; these are all. Each of these operations is of the utmost simplicity, depending on individual action and not on concert, and they may all be taught in a very short time. There is no manœuvring, no marching, no wheeling. The squad of one gun may be marched to another, but the service of both is the same. Even the art of pointing cannon is, to an American militiaman, an art of easy attainment, from the skill that all our countrymen acquire in the use of fire-arms—"drawing sight, or aiming," being the same art, modified only by the difference in the gun.

The mode of applying this force may be illustrated by the case of any of our cities on the seaboard. The forts and batteries, being put in perfect condition, should be garrisoned (at least the more important ones) by a small body of regular artillery, such as our present military force could supply, and sufficient for the preservation of the public property, and to afford indispensable daily guards; to these should be added two or three men of the ordnance department, especially charged with the condition of the armament and ammunition, and two or three engineer soldiers, whose sole duty it would be to attend to the condition of the fortifications; keeping every part in a state of perfect repair. In certain important works, however, that would be exposed to siege, or to analogous operations, it would be prudent, especially in the beginning of a war, to keep up a more considerable body of regular troops.

The volunteer force of the city should then be divided into detachments, without disturbing their company organization, and should be assigned to the several works, according to the war garrisons required at each; from four to six men, according to circumstances, being allowed to each gun.

The larger works might require ten, fifteen, or even twenty companies; the smaller, one, two, three, or more companies; and, in some cases, even a platoon might suffice. Being thus assigned, each portion of the city force would have its definite alarm-post, and should be often taken to it, and there exercised in all the duties of its garrison, and more especially in the service of its batteries and in its defence against assault. The multiplicity of steamboats in all the cities would enable the volunteers to reach even the most distant alarm-posts in a short time.

In order that all these troops may become expert in their duty, one of the works most convenient to the city, besides being the alarm-post of some particular portion of the volunteers, should, during peace, be the ordinary school of drill for all; and in this the detachments should, in turn, assemble and exercise.

Besides the mere manual of the gun and battery, there should be frequent target practice, as being not only necessary to the proper use of the battery but as imparting interest and excitement to the service.

It might be necessary for a time to submit the volunteers to the drill of a competent officer or non-commissioned officer of the regular artillery; and, in particular, to conduct the practice with shot and shells under such instruction.

The portion of the military force of the city not stationed in the fixed batteries would constitute, under an impending attack, a reserve, posted either in one or several bodies, according to circumstances, ready to cover exposed points, to co-operate in offensive movements, or to relieve exhausted garrisons: this

portion having connected with it the mounted force, the field artillery, and the heavy movable guns.

This appropriation of the volunteer force to the immediate defence of the city would operate in the most favorable way upon that force, superadding to the impulses of patriotism every feeling connected with family, property, and social and civil relations, and, while making military service the first of duties, relieving it of hardship and privation. It would be a peculiar feature in this kind of service that the governing motive in the choice of officers would be favorable to the condition of the troops, every man feeling that the safety of his dearest concerns depended on the efficiency and courage of his officers. The same motive would prompt him, moreover, to desire, and contribute to, the highest state of efficiency in the corps.

The organization of volunteer force here contemplated may comprehend the whole maritime frontier; and be applicable, also, at the more populous points upon the inland borders.

This arrangement, while it might be an enduring one, would be the least expensive by far of any that would be efficient.

The days of exercise, drill, and encampment should be fixed and invariable, in order that they may the less interfere with the private occupations of the volunteers. During an impending attack, greater or less portions should be constantly at these posts; but still the service would comprise but a very small portion of the year.

According to the value of the interest to be defended, and the extent of the works to be occupied, would be the rank of the chief command; which should be intrusted to an officer of the regular army, whose control might often be extended, advantageously, over a certain extent of seaboard to the right and left, constituting a maritime department.

In the tables to be presented at the end of this report, we shall give the whole number of men required for the complete defence of each of the works.

We now proceed to examine the coast in detail; and, in order to conform to the Senate's resolution, we shall divide the whole sea-coast of the United States into two great portions: the first portion extending from *Passamaquoddy bay to Cape Florida;* the second from *Cape Florida to the mouth of the Sabine.* In our description we shall, without any other than this general acknowledgment, quote largely from a report presented to Congress in April, 1836, and to be found in the Senate documents of the 1st session 24th Congress, No. 293, vol. 4. This report contains an argument on the general subject, embodying many important considerations, which we have thought best not to repeat in this lengthened report, but to refer to as worthy of perusal.

We will conduct the examination geographically, beginning at the northeastern extremity, and referring in every case to accompanying tables which exhibit the several works in the order of relative importance as to time.

COAST FROM PASSAMAQUODDY BAY TO CAPE FLORIDA.

The extreme northeastern section of this coast, extending from Quoddy Head to Cape Cod, is characterized by its serrated outline and its numerous harbors, and, at certain seasons, by its foggy atmosphere. The extent of this section, measuring from point to point wherever the breaks of the coast are abrupt, is about 500 miles; while a straight line from one of the above-mentioned capes to the other is hardly half that distance. The eastern half is singularly indented by deep bays; the coast being universally rocky and possessing numerous islands surrounded by deep water, which islands not only increase the number of harbors, but cover, besides, an interior navigation well understood by the hardy coasters and measurably secured by its intricacies, and the other dangers of this boisterous and foggy region, from interruption by an enemy. The western

half is much less broken; it is covered by few islands in comparison, but contains several excellent harbors.

The eastern harbors of Maine are exposed in a peculiar manner. They are not only on the flank of our line, but they are also quite near the public establishments of the greatest maritime power. They are, moreover, as yet backed by only a thin population; and are, consequently, weak as well as exposed. The time may not, however, be very distant when, becoming wealthy and populous, they will be objects of a full portion of the national solicitude. Works designed for these harbors must therefore be calculated for the future; must be founded on the principle that they must defend places much more important than any now existing there; that, being near the possessions of a foreign power, they will be in a particular manner liable to sudden and repeated attacks; and that, lying at the extremity of the coast, they are liable to be tardily succored. The works must consequently be competent to resist escalade, and to hold out for a few days. Feebler works might be more injurious than beneficial: their weakness would in the first place invite attack; and it being often a great advantage to occupy fortified places in an adversary's territory, the enemy could prepare himself to remedy the deficiencies of the forts after they should fall into his hands, by adding temporary works, by providing strong garrisons, and by aiding the defence with his vessels.

No surveys have been made of these harbors, and no plans formed for their defence. It may be well to observe here, once for all, that much confidence is not asked for the mere conjectures presented below, as to the number and cost of the works assigned for the protection of the harbors which have not yet been surveyed: in some cases there may be mistakes as to the number of forts and batteries needed; in others, errors will exist in the estimated cost.

Eastport and *Machias* may be mentioned as places that will unquestionably be thought to need defensive works by the time, in the order of relative importance, the execution of them can be undertaken by the government. There are several small towns eastward of Mount Desert island that may, at that period, deserve equal attention; at present, however, the places mentioned will be the only ones estimated for; and $100,000 will be assumed as the cost at each.—(Statement 1, table F.)

Mount Desert island, situated a little east of Penobscot bay, having a capacious and close harbor, affording anchorage for the highest class of vessels, and easily accessible from sea, offers a station for the navy of an enemy superior to any other on this part of the coast. From this point his cruisers might act with great effect against the navigation of the eastern coast, especially that of Maine; and his enterprises could be conducted with great rapidity against any points he might select. These considerations, added to the very great advantage in certain political events, of our occupying a naval station thus advanced, whence we might act offensively, together with the expediency of providing places of succor on a part of the coast where vessels are so frequently perplexed in their navigation by the prevailing fogs, lead to the conclusion that the fortification, in a strong manner, of this roadstead may before long be necessary. A survey of this island was begun many years ago; but the party being called off to other duties it was never completed. The project of defensive works has not been made. The entire cost may be, as assumed by the engineer department some years ago, $500,000.—(Statement 1, table F.)

Castine.—It would seem to be impossible, on this coast, to deprive an enemy enjoying naval superiority of harbors, or prevent his using them as stations during a war—insular situations, which his vessels would render unapproachable, being so numerous; but it seems proper that such of these positions as are the sites of towns should be secured. During the last war the English held the position of Castine for some time, and left it at their pleasure. It is probable a

work costing about $50,000 would deter an enemy from again making choice of this position.—(Statement 1, table F.)

Penobscot bay.—Upon this bay, and upon the river of the same name flowing into it, are several flourishing towns and villages. Of the many bays which intersect the coast the Penobscot is the one which presents the greatest number of safe and capacious anchorages. As before observed a large portion of these harbors must, for the present, be left without defences, but the valuable commerce of the bay and river must be covered; and to afford a secure retreat for such vessels as may be unable to place themselves under the protection of the works to the east or west of the bay, the passage of the river must be defended. The lowest point at which this can be done without great expense is opposite Bucksport, at the "narrows." A project has been given in for a fort at that position estimated at $150,000.—(Statement 1, table D.)

St. George's bay, Broad bay, Damariscotta, and Sheepscut.—West of the Penobscot occur the above-mentioned bays, all being deep indentations leading to towns, villages, and various establishments of industry and enterprise. The bays have not been surveyed, and of course no plans have been formed for their defence. $400,000 are assigned to the defence of these waters. The Sheepscut is an excellent harbor of refuge for vessels of every size.—(Statement 1, table F.)

Kennebeck river.—This river (one of the largest in the eastern States) enters the sea nearly midway between Cape Cod and the mouth of the St. Croix. It rises near the source of the Chaudière, which is a tributary of the St. Lawrence, and has once served as a line of operations against Quebec. The situation and extent of this river, the value of its products, and the active commerce of several very flourishing towns upon its banks, together with the excellence of the harbor within its mouth, will not permit its defence to be neglected. The surveys begun many years ago were never finished. The estimated cost of defences, as formerly reported by the engineer department, was $300,000. Positions near the mouth will permit a secure defence.—(Statement 1, table D.)

Portland harbor.—The protection of the town, of the merchantmen belonging to it, and of the ships-of-war that may be stationed in this harbor to watch over this part of the coast, or that may enter for shelter, (all of them important objects,) may be secured, as an inspection of the map of the harbor will show, by occupying Fort Preble Point, House island, Hog Island ledge, and Fish Point.

If the two channels to the west and east of Hog island can be obstructed at small expense (to decide which some surveys are yet necessary) there will be no necessity for a battery on the ledge, and Fish Point need be occupied only by such works as may be thrown up in time of war. The expense, as now estimated, of the works planned for this defence, will be $155,000 for Fort Preble, and $48,000 for House island; for Hog Island channel say, $135,000.—(Statement 1, tables A, D, E, and F.) In addition there must be repairs immediately applied to the old works at an expense of $6,600.

Saco, Kennebunk, and York.—Small works comparatively will cover these places; $75,000 is assumed as the aggregate cost.—(Statement 1, table F.)

Portsmouth harbor and navy yard.—The only good roadstead or harbor between Cape Elizabeth and Cape Ann is Portsmouth harbor, within the mouth of Piscataqua river. Line-of-battle ships can ascend as high as Fox Point, seven miles above the town. This situation, sufficiently commodious for a secondary naval depot designed to repair vessels of war, should be maintained; but it is to be regretted that the bay to the south of Fox Point was not chosen as the site of the navy yard instead of Fernald's island. Being where it is, it will be necessary, in time of war, to make some particular dispositions for the protection of the navy yard from an attack from the north shore of the river.

The position of Fort Constitution will certainly, and that of Fort McCleary

will probably, be occupied by the defences, though the works themselves should give place to those that will better fulfil the object. The other positions for forts or batteries are Gerrishe's Point, Fishing island, and Clark's island, some, if not all, of which must be occupied. Surveys are required before the projects can be formed, or before estimates can be made; but there is reason for believing that the entire cost of fortifying this harbor will not fall short of $300,000.—(Statement 1, table D.)

Newburyport harbor.—The points forming the mouth of the harbor are continually changing, and it seems necessary, therefore, to rely, for the defence of the harbor, on works to be thrown up during a war. There is only a shoal draught of water. It is thought $100,000 will defend this harbor adequately.—(Statement 1, table F.)

Gloucester harbor.—The position of this harbor, near the extremity of Cape Ann, places it in close relation with the navigation of all Massachusetts bay, and imparts to it considerable importance. No surveys have yet been made, but it is believed that sufficient defence may be provided for $200,000.—(Statement 1, table E.) Should there be any occasion for defensive works before the proposed new works can be commenced, an expenditure of $10,000 in repairs of the old fort will be required.—(Table A.)

Beverly harbor.—This harbor will be defended chiefly by a portion of the works designed for Salem. $50,000 in addition will secure it.—(Statement 1, table F.)

Salem harbor.—The port of Salem is distant from Marblehead two miles, and separated therefrom by a peninsula. The occupation of the extremity of Winter island (where are the ruins of Fort Pickering) on one side, and Nangus Head on the other, will effectually secure this harbor. Projects have been presented for this defence, estimated to cost $225,000.—(Statement 1, tables D and F.) On a sudden emergency, old Fort Lee may be put in an effective state for $2,000.—(Table A.)

Marblehead harbor.—Besides covering, in some measure, the harbor of Boston, Salem and Marblehead harbors possess an important commerce of their own, and also afford shelter for vessels prevented, by certain winds, from entering Boston, or pursuing their course eastward. The proposed mode of defending Marblehead harbor consists in occupying, on the north side, the hillock which commands the present Fort Sewall, (which will be superseded by the new work,) and, on the south, the position of Jack's Point. The two works will cost $318,000.—(Statements 1, tables D and F.)

To repair old Fort Sewall, which may be necessary, if the new works are not soon begun, will require $10,000.—(Table A.).

Boston harbor.—We come now to the most important harbor in the eastern section of the coast; and, considering the relation to general commerce, and the interests of the navy, one of the most important in the whole Union.

After a careful examination of all the necessary conditions of such a problem, the board of naval officers and engineers, in their joint report of 1820, gave this harbor a preference over all other positions to the east, and inclusive, of New York bay and the Hudson, as the seat of the great northern naval depot; and the government, by the great additions and improvements that have from year to year been since made to the navy yard on the Charlestown side, have virtually sanctioned the recommendation of the board. But, independent of the navy yard, Boston is a city of great wealth, and possesses an extensive and active commerce.

The old works defended merely the interior basin from attacks by water; but, as it often happens that vessels enter Nantasket roads with a wind too scant to take them to the city, or are detained in President roads by light winds or an adverse tide; as the former, especially, is a very convenient anchorage whence to proceed to sea; and, above all, as Nantasket roads affords the best possible

station for a blockading squadron, it was deemed indispensable to place permanent defences at the mouth of the harbor. The project of defence regards the existing works, with the necessary repairs and modifications, as constituting a second barrier.

Besides a permanent work, now well advanced, on George's island, it contemplates permanent works on Nantasket Head; filling up the Broad Sound channel, so as to leave no passage in that direction for ships-of-war.

Until the best draught for steam vessels of war shall be well ascertained, it will not be safe to say to what depth the Broad Sound channel should be restricted; nor, indeed, can it be positively asserted that this description of vessel can be conveniently excluded by such means. Other vessels *can*, however, be thus excluded; and steam vessels passing this channel would still have to pass the inner barrier. The estimated cost of the works for this harbor is $2,040,000.

Besides the works of a permanent character, it will be necessary, in the beginning of a war, to erect several temporary works on certain positions in the harbor, and on the lateral approaches to the navy yard.—(Statement 1, tables A, E, and F.)

Plymouth and Provincetown harbors.—These harbors have a commerce of some consequence of their own, but they are particularly interesting in reference to the port of Boston. While these are undefended, an enemy's squadron blockading Massachusetts bay will have ports of refuge under his lea, which would enable him to maintain his blockade, even throughout the most stormy seasons—knowing that the winds which would force him to seek shelter would be adverse to outward-bound, and fatal to such inward vessels as should venture near the Cape. Were the enemy deprived of these harbors, he would be unable to enforce a rigorous investment, as he would be constrained to take an offing on every approach of foul weather. Our own vessels coming in from sea, and finding an enemy interposed between them and Boston, or, being turned from their course by adverse winds, would, in case of the defence of these ports, find to the south of Boston shelters equivalent to those provided in the east, at Marblehead, Salem, Gloucester, and Portsmouth. Plymouth harbor has not been fully surveyed. Provincetown harbor has been surveyed, but the projects of defence have not been formed. The former, it is thought, may be suitably covered by a work of no great cost on Garnett Point; while, to fortify Provincetown harbor in such a way as to cover vessels taking shelter therein, and at the same time deprive an enemy of safe anchorages, will involve considerable expense. Probably no nearer estimate can be formed at present, than that offered by the engineer department some years ago, which gave $100,000 for Plymouth, and $600,000 for Provincetown.—(Statement 1, tables D and E.)

The coast between Cape Cod and Cape Hatteras differs from the northeastern section in possessing fewer harbors, in having but little rocky and a great portion of sandy shore, in its milder climate and clearer atmosphere; and it differs from all the other portions in the depth and magnitude of its interior seas and sounds, and in the distance to which deep tide navigation extends up its numerous large rivers. The circuit of the coast, not including the shores of the great bays, measures 650 miles, while a straight line from one of the above-named capes to the other measures about 520 miles.

Martha's Vineyard sound.—To the south of Cape Cod lie the islands of Nantucket and Martha's Vineyard, which, with several smaller islands on the south, and the projection of Cape Malabar on the east, enclose the above-named sound. The channels through this sound, being sufficient for merchant vessels, and one of the channels permitting the passage even of small frigates, are not only the constant track of coasting vessels, but also of large numbers of vessels arriving in the tempestuous months from foreign voyages. There are within the sound the harbors of *Tarpaulin Cove, Holmes's Hole, Edgartown, Falmouth, Hyannis, and Nantucket,* besides small anchorages.

In addition to the many thousand vessels passing this water annually, (of which there are sometimes forty or fifty,) a portion, containing very valuable cargoes, to be seen in the harbors awaiting a change of wind, there is supposed to be at least 40,000 tons of whaling vessels owned in the towns of this sound.

If the harbors just named are to be defended at all, it must be by fortifications. There is little or no population except in the towns, and even this is believed to be entirely without military organization. A privateer might run into either of these harbors, and capture, destroy, or levy contributions at pleasure. The use of the sound itself, as an anchorage for vessels of war, cannot be preprevented by fortifications alone. $250,000 may, perhaps, suffice for the defence of all the harbors against the kind of enterprise to which they are exposed.—(Statement 1, table F.)

New Bedford and Fairhaven harbor.—No survey has been made of this harbor, on which lie two of the most flourishing towns. It is easily defensible, and the amount formerly assumed by the engineer department will probably suffice, namely, $300,000.—(Statement 1, table D.)

Buzzard's bay.—Interposed between the main and the island of Martha's Vineyard, are the Elizabeth islands, which bound Buzzard's bay on the south. This bay covers the harbor of New Bedford, and might be used as an anchorage by an enemy's fleet; but it is too wide to be defended by fortifications.

Narraganset bay.—The properties of this great roadstead will be here briefly adverted to. More minute information may be obtained by reference to reports of 1820 and 1821.

As a harbor, this is acknowledged by all to be the best on the whole coast of the United States; and it is the only close man-of-war harbor that is accessible with a northwest wind, the prevailing and most violent wind of the inclement season. Numerous boards and commissions, sometimes composed of naval officers, sometimes of army officers, sometimes of officers of both services, have, at different times, had the subject of this roadstead under consideration; and all have concurred in recommending, in strong terms, that it be made a place of naval rendezvous and repair, if not a great naval depot; one or more of these commissions preferring it, for the latter purpose, to all other positions. These recommendations have not been acted on; but it is next to certain that a war would force their adoption upon the government.

With the opening of this anchorage properly defended, hardly a vessel-of-war would come, either singly or in small squadrons, upon the coast, in the boisterous season, without aiming at this port, on account of the comparative certainty of an immediate entrance. And this would be particularly the case with vessels injured by heavy weather, or in conflict with an enemy; with vessels bringing in prizes, or pursued by a superior force.

This use of the port would almost necessarily bring with it the demand for the means of repairing and refitting; and the concentration of these upon some suitable spot would be the beginning of a permanent dock yard.

For the same reason that ships-of-war would collect here, it would be a favorite point of rendezvous for privateers and their prizes, and a common place of refuge for merchantmen.

From this, as a naval station, the navigation of Long Island sound, and the communication between this and Martha's Vineyard sound, or Buzzard's bay, might be well protected; New London harbor would be covered; the navy yard would command southwardly, as from Hampton roads northwardly, the great inward curve of the coast between Cape Cod and Cape Hatteras; the influence of which command over the blockading operations of an enemy will be apparent, when it is considered that the only harbors of refuge left to him will be the Delaware, Gardiner's, and Buzzard's bays, and Martha's Vineyard sound.

The bays first mentioned belong to the class, before alluded to, which, being too wide for complete defence by batteries, must call in such auxiliary defences

as the navy may supply; and, in reference to their defence by these means, nothing can be more important than the fortification of Narraganset roads, because all but the first of the bays just named (including an anchorage for ships-of-war under Block island) would be commanded by a single squadron of those floating defences lying in these roads. To a squadron of steam batteries, for instance, lying under the fortifications, it would be a matter of little consequence into which of the above anchorages an enemy should go—all being within reach in three or four hours, and some within sight. We will here observe, by the way, that this use of floating defences is in accordance with the principle before insisted on; they are not expected to close the entrance into these several bays, that would require a squadron for each at least equal to the enemy's; but as the enemy goes in merely for rest or shelter, and there is no object that he can injure, he may be permitted to enter, and our squadron will assail him only when the circumstances of wind, weather, &c., give all the advantages to the attack. The fortification of Narraganset roads is therefore, in effect, a most important contribution toward the defence of all the neighboring anchorages.

But the same properties that make Narraganset roads so precious to us, would recommend them to the enemy also; and their natural advantages will be enhanced in his eyes by the value of all the objects these advantages may have accumulated therein.

If this roadstead were without defence an enemy could occupy it without opposition, and, by the aid of naval superiority, form a lodgment on the island of Rhode Island for the war. Occupying this island with his troops, and with his fleets the channels on either side, he might defy all the forces of the eastern States; and while, from this position, his troops would keep in alarm and motion the population of the east, feigned expeditions against New York, or against more southern cities, would equally alarm the country in that direction; and thus, though he might do no more than menace, it is difficult to estimate the embarrassment and expense into which he would drive the government.

It has been alleged that similar consequences would flow from the occupation of other positions, (such, for instance, as are afforded in the bays just mentioned,) and that, therefore, the defence in a strong manner of Narraganset roads is useless.

Even allowing that there are other advantageous and inaccessible positions whereon an enemy might place himself, is it a reason because the foe can in spite of us, possess himself of comparatively unsafe and open harbors, that we should not apply to our own uses, but yield up to him the very best harbor on the coast; that we should submit to capture and destruction the valuable objects that accumulate in consequence of the properties of the harbor?

But it is believed that none of the outer and wider harbors will answer for such an establishment as we have supposed, nor for any other purpose than an occasional anchorage of ships-of-war; and for these reasons, amongst others: that although ships-of-war might possibly ride in these broad waters at all seasons, it would seem to be a measure of great temerity for transports to attempt it, except in the mildest seasons; and there can be little doubt that a hostile expedition would resort to no harbor as a place of rendezvous, unless it afforded sure protection to its transports; these being the only means by which ulterior purposes could be executed, or final retreat from the country effected.

If, moreover, Narraganset roads be fortified and become a naval station, or at least the station of a floating force designed to act against these outer waters, such an establishment by any enemy would at once be put upon the defensive, and require the constant presence of a superior fleet; thus measurably losing the object of the establishment.

Independent of the qualities of the harbor, however, none of these bays would answer our purpose: 1st. Because they cannot be securely defended; and, 2d.

Because they are difficult of access from the main—the communication with them being liable to interruption by bad weather, and liable to be cut off by the enemy.

The defence adopted for Narraganset roads must be formidable on the important points, because they will be exposed to powerful expeditions. Although the possession of this harbor, the destruction of the naval establishment, the capture of the floating defences, and the possession of the island as a place of debarkation and refreshment, should not be considered as constituting, of themselves, objects worthy a great expedition, they might very well be the preliminary steps of such expedition; and defences weak in their character might tempt, rather than deter it; for, although unable to resist his enterprise, they might be fully competent, after being captured and strengthened by such means as he would have at hand, to protect him from offensive demonstrations on our part.

There are, besides, in the local circumstances, some reasons why the works should be strong. The channel on the eastern side of the island, being permanently closed by a solid bridge, requires no defensive works; but this bridge being at the upper end of the island, the channel is open to an enemy all along the eastern shore of the island. Works erected for the defence of the channel on the west side of the island cannot, therefore, prevent, nor even oppose, a landing on the eastern side. The enemy, consequently, may take possession, and bend his whole force to the reduction of the forts on the island, which cannot be relieved until a force has been organized, brought from a distance, conveyed by water to the points attacked, and landed in the face of his batteries: all this obviously requiring several days, during which the forts should be capable of holding out. To do this aganist an expedition of 10,000 or 20,000 men, demands something more than the strength to resist a single assault.

Unless the main works be competent to withstand a seige of a few days, they will not therefore fulfil their trust, and will be worse than useless.

It must here be noticed that, although the works do not prevent the landing of an enemy on Rhode Island, they will, if capable of resisting his efforts for a few days, make his residence on the island for any length of time impossible: since forces in any number may be brought from the main and landed under the cover of the fire of the works.

To come now to the particular defences proposed for this roadstead. It must be stated that there are three entrances into Narraganset roads:

1. The eastern channel, which passes up on the east side of the island of Rhode Island. This, as before stated, being shut by a solid bridge, needs no defence by fortifications, other than a field-work or two, which may be thrown up at the opening of a war.

2d. The central channel, which enters from sea by passing between Rhode Island and Canonicut island. This is by far the best entrance, and leads to the best anchorage; and this it is proposed to defend by a fort on the east side of the entrance, designed to be the principal work in the system. This work, called Fort Adams, is nearly completed. On the west side of the entrance it is proposed to place another work; and on an island, called Rose island, facing the entrance, a third work. It is also proposed to repair the old fort on Goat island, just within the mouth; and also old Fort Green, which is a little higher up, and on the island of Rhode Island.

3d. As to the western passage, three modes present themselves: first, by reducing the depth of water by an artificial ledge, so as while the passage shall be as free as it is now for the coasting trade, it shall be shut as to the vessels of war, including steam-vessels; second, by relying on fortications alone to close the channel; or, third, by resorting in part to one and in part to the other modes just mentioned. Either is praticable; but, being the least expensive and most certain, the estimates are founded on the first.

The total cost of the Narraganset defences is estimated at $1,817,482.—(Statement 1, tables A, B, D, E, and F.)

Gardiner's bay.—It is uncertain whether this harbor, which would be a very valuable one to an enemy investing this part of the coast, is defensible by fortifications alone. After it shall have been surveyed, it may appear that from one or more positions, the whole anchorage may be controlled by heavy sea mortars. In such a case, the defensive works would not be costly. If it be found expedient to fortify some particular portion of the bay, as an anchorge for steam batteries, (which, however, is not anticipated,) the expense would probably be as great as was anticipated some years since by the engineer department, viz: $400,000,—(Statement 1, table F.)

Sag Harbor, New York, and Stonington, Connecticut.—Neither of these harbors has been surveyed with reference to defence. The first is possessed of conconsiderable tonnage; and the second, besides being engaged in commerce, is the terminous of a railroad from Boston. $100,000 may be assigned to the first, and $200,000 to the other.—(Statement 1, tables E and F.)

New London harbor is very important to the commerce of Long Island sound; and, as a port of easy access, having great depth of water, rarely freezing, and being easily defended, it is an excellent station for the navy. It is also valuable as a shelter for vessels bound out or home, and desirous of avoiding a blockading squadron off Sandy Hook.

In the plan of defence, the present forts (Trumbull and Griswold) give place to more efficient works, whereof the expense is estimated at $441,000.—(Statement 1, tables C and F.)

Mouth of Connecticut river.—This river has been shown to be subject to the expeditions of an enemy. No survey has been made with a view to its defences; $100,000 is introduced here as the conjectural cost.—(Statement 1, table F.)

New Haven harbor.—It is proposed to defend this harbor by improving and enlarging Fort Hale, and substituting a new work for the slight redoubt erected during the last war, called Fort Wooster. The expense of both may be set down at $90,000, exclusive of $5,000 for immediate repairs of old Fort Hale.—(Statement 1, table F.)

There are several towns between New Haven and New York, on both sides of the sound; none of them are very large as yet, still, most, if not all, are prosperous and increasing. Although, in their present condition, it might not be deemed necessary to apply any money to permanent defences, yet, as part of the present object is to ascertain, as near as may be, the ultimate cost of completely fortifying the coast, it seems proper to look forward to the time when some of these towns may become objects of predatory enterprises of some magnitude. Bearing in mind the probable increase of population in the mean time, and the situation of the places generally, it is thought that $200,000 will be enough to provide defences for all.—(Statement 1, table F.)

New York harbor.—The objects of the projected works for the security of New York are to cover the city from an attack by land or sea; to protect its numerous shipping; to prevent, as far as possible, the blockade of this great port; and to cover the interior communication uniting this harbor with the Delaware. In the present condition of the defences an enemy would encounter no great opposition, whether his attack were made by land or water.

There are two avenues to the city, namely: one by the main channel, direct from sea, and one by the sound. If an enemy come by the way of the sound, he may now land his forces on the New York side, at Hell Gate, within less than ten miles of New York, and the next day, at the latest, be in the city; or he may land on the Long Island side at the same distance, and in the same time be master of the navy yard and of Brooklyn heights, whence the city of New York

is perfectly commanded; or he may divide his forces and reach both objects at the same moment.

The projected system of defence closes this avenue at the greatest distance possible from the city, namely, at Throg's Point. The occupation of this point will force the enemy to land more than twenty miles from the city on one side, and still further from the navy yard on the other.

A work now in progress at Throg's Point will probably prevent any attempt to force this passage. It will, as we have seen, oblige an enemy to land at a considerable distance from the object; and, as he will then be unable to turn the strong position afforded by Harlem river, the cover on the New York side will be sufficient.

But should he land on the Long island side he might, by leaving parties on suitable positions with a view to prevent our crossing the river and falling on his rear, make a dash at the navy yard, having no obstacle in his front. To prevent this effectually, and also to accomplish other objects, a work should be erected on Wilkins's Point, opposite Throg's Point. This work, besides completing the defence of the channel, would involve a march against the navy yard from this quarter in great danger; since all the forces that could be collected on the New York shore might, under cover of this work, be crossed over to Long island, and fall on the rear of the enemy, cutting off his communication with the fleet. The two works on Throg's and Wilkins's Points may, therefore, be regarded as perfectly protecting, on that side, the city and navy yard.

Against an attack by the main channel there are—

1st. The works in the vicinity of the city, which would act upon an enemy's squadron only after its arrival before the place. They consist of Fort Columbus, Castle Williams, and South Battery, on Governor's island; Fort Wood, on Bedlow's island; and Fort Gibson, on Ellis's island.

It is necessary that these works be maintained, because, in the event of the lower barrier being forced, these would still afford a resource. It is a disadvantage of their positions, however, that the destruction of the city might be going on simultaneously with the contest between these forts and the fleet. They cannot, however, be dispensed with, until the outer barriers are entirely completed, if even then.

2d. At the Narrows, about seven miles below the city, the psssage becomes so contracted as to permit good disposition to be made for defence. On the Long island side of the Narrows is Fort Lafayette, which is a strong water-battery standing on a reef at some distance from the shore; and immediately behind it, on the top of the bank, is a small but strong work, called Fort Hamilton. Some repairs being applied to these works, this position may be regarded as well occupied.

On the west side, or Staten island side of the narrows, are the following works belonging to the State of New York, viz: *Fort Richmond*, which is a water-battery; *Battery Hudson*, which is at some height above the water; *Battery Morton*, which is a small battery on the top of the hill; and *Fort Tomkins*, which is also on the top of the hill, and is the principal work. All these need great repairs; but, being once in proper order, would afford a very important contribution to the defence of the passage; nothing further, indeed, being contemplated for this position, except the construction of a small redoubt on a commanding hill, a little to the southwest. The repairs of these works cannot too soon be taken in hand; and it is hoped some arrangement may soon be made with the State authorities to that end.

With the Narrows thus defended, and the works near the city in perfect order, New York might be regarded as pretty well protected against an attack by water through this passage.

But there lies below the narrows a capacious bay, affording good anchorage for any number of vessels-of-war and transports. An enemy's squadron being

in that bay into which entrance is very easy, would set a seal upon this outlet of the harbor. Not a vessel could enter or depart at any season of the year. And it would also intercept the water communication, by the way of the Raritan, between New York and Philadelphia.

The same squadron could land a force on the beach of Gravesend bay, (the place of the landing of the British, which brought on the battle of Long island in the revolutionary war,) within seven miles of the city of Brooklyn, of its commanding height, and of the navy yard, with no intervening obstacle of any sort.

This danger is imminent, and it would not fail, in the event of war, to be as fully realized as it was during the last war, when, on the rumor of an expedition being in preparation in England, 27,000 militia were assembled to cover the city from an attack of this sort. It is apparent that the defences near the city, and those at the Narrows, indispensable as they are for other purposes, cannot be made to prevent this enterprise, which can be thoroughly guarded against only by—

3d. An outer barrier at the very mouth of the harbor. This would accomplish two objects of great consequence, namely, rendering a close blockade of the harbor impossible; and obliging an enemy, who should design to move troops against the navy yard, to land at a distance of more than twenty miles from his object, upon a dangerous beach; leaving, during the absence of the troops, the transports at anchor in the ocean, and entirely without shelter. The hazards of such a land expedition would, moreover, be greatly enhanced by the fact that our own troops, by passing over to Long island under cover of the fort at Wilkins's Point, could cut off the return of the enemy to his fleet, which must lie at or somewhere near Rockaway; time, distance, and the direction of the respective marches, would make, very naturally, such a manœuvre a part of the plan of defence. Against an enemy landing in Gravesend bay, no such manœuvre could be effectual, on account of the shortness of his line of march, as well as of its direction.

In view of these considerations, the board of engineers projected additional works—one for the *east bank* and another for the *middle ground;* these positions being on shoals on either hand of the bar, outside of Sandy Hook. Before determining on the works last mentioned, the board went into much research in order to ascertain whether these shoals were unchangeable, and it was thought to have been fully proved that there had been no material alteration in more than sixty years. This apparent stability of the shoals encouraged the board to devise the project referred to.

Recent surveys have, however, discovered a new or rather another channel. If it be indeed a *new* channel, it shows a want of stability in the shoals that forbids any such structures as the contemplated batteries, and it may be necessary to resort to other means. Suitable means exist, unquestionably, though it may not be best to decide on them until all doubt as to the fixed or changing nature of the channel shall be removed, especially as it must necessarily be some time before the completion of more indispensable works will allow the commencement of these. This may, however, be said with certainty, namely: that, all other means failing, works may be erected on Sandy Hook which will have a good action upon the channel, and under cover of which bomb ketches or steam batteries, or both, may lie. With such an arrangement there would be little probability of the lower bay being occupied as a blockading station.

To recapitulate: The security of the city of New York and the navy yard requires, first, defences on the passage from the sound; namely, the completion of Fort Schuyler on Throg's Point, and the erection of a fort on Wilkins's Point—cost of both, $976,000; second, the repair of works on Governor's island, on Bedloe's island, and on Ellis's island—estimated cost, $170,897; third, the repair of the works at the Narrows, including the works belonging to

the State—cost, $475,000; and, fourth, the erection of outer defences on or near Sandy Hook—estimated by the board of engineers to cost $3,362,824.

The total cost, exclusive of these last, will therefore be $1,621,897, or, including these, $4,984,721.—(Statement 1, tables A, C, and F.)

Delaware bay, Fort Delaware, Fort Mifflin, Delaware breakwater.—The coast from the mouth of the Hudson to the Chesapeake, as well as that on the south side of Long island, is low and sandy, and is penetrated by several inlets; but not one besides the Delaware is navigable by sea-going vessels. The Delaware bay itself, being wide and full of shoals, having an intricate channel, and being much obstructed by ice in the winter, affords no very good natural harbor within a reasonable distance of the sea.

The artificial harbor now in course of construction near Cape Henlopen will, it is hoped, fully supply this need, in which event it must be securely fortified. No plans have, however, as yet been made with that object, and as to the probable cost, nothing better can now be done than to assume the conjectural estimate made some years since in the engineer department, namely, $600,000.—(Statement 1, table F.)

The lowest point at which the bay is defensible is at Pea Patch island, about forty-five miles below the city of Philadelphia. A fort on that island, to replace the one destroyed by fire; a fort opposite the Pea Patch, on the Delaware shore, to assist in commanding the Delaware channel, and at the same time protect the mouth of the Delaware and Chesapeake canal; a temporary work on the Jersey shore, to be thrown up at the commencement of a war, to assist in closing the channel on that side; together with floating obstructions, to be put down in moments of peril, will effectually cover all above this position—including Philadelphia and its navy yard, Wilmington, Newcastle, the canal before mentioned, and the Philadelphia and Baltimore railroad.

The commencement of the rebuilding of Fort Delaware being delayed by difficulties attending the settlement of new claims to the island on which it is to stand, Fort Mifflin, which is an old work about seven miles below the city of Philadelphia, has been put in good order. This work is ready to receive its armament and its garrison.

The expense of the work on Fort Delaware may be estimated at $491,000, and of the fort opposite, $521,000.—(Statement 1, tables C and F.)

Chesapeake bay.—The board of naval officers and engineers intrusted with the selection of sites for a great northern and a great southern naval depot, recommended in their joint reports of 1819 and 1820 Burwell's bay, on James river, for the one, and Charlestown, in Boston harbor, for the other. They also recommended Boston harbor and Narraganset bay, at the north, and Hampton roads, at the south, as chief naval rendezvous. In those reports the commissioners entered at large into the consideration of all the matters relating to these important objects, and reference is now made to those reports for many interesting details.

Hampton roads, James river, Norfolk, and the navy yard.—The works projected for the defence of these are, 1st, a fort at Old Point Comfort—this is called Fort Monroe; 2d, a casemated battery, called Fort Calhoun, on the Rip Rap shoals, opposite Old Point Comfort; and, 3d, a line of floating obstructions extending across the channel from one of these works to the other. It was the opinion of the commission above mentioned that, in the event of a great naval depot being fixed on James river, it might ultimately be proper to provide additional strength by placing works on the positions of Newport News, Wassaw shoals, and Craney Island flats. Such an expansion has, however, since then been given to the present navy yard at Gosport, (opposite Norfolk,) that there is little probability of any other position on these waters being occupied for such purposes.

The great importance of retaining Hampton roads during a war, and of cover-

ing the navy yard, is conceded on all hands. The bearing of this harbor upon the general defence of the Chesapeake bay is, perhaps, equally well understood, it being very evident that a small hostile force would reluctantly venture up the bay, or into York river, or the Rappahannock, or any of the upper harbors, leaving behind them a great naval station, and the common rendezvous of the southern coast—a station seldom in time of war without the presence of a number of vessels just ready for, or just returned from, sea.

A very important bearing upon the security of Norfolk and the navy yard, independent of the closing the channel to those places, is, however, not generally understood, and has been entirely overlooked in the official animadversions (before mentioned) on the system of defence of the board of engineers.

If we suppose no defences at the mouth of the roadstead, or only such as can be disregarded or easily silenced, an enemy might debark his troops in Linnhaven bay, and despatch them against Norfolk, while his fleet would pass up the harbor to the vicinity of the town, not only covering the flank of his troops, but landing parties to turn any position that might be taken by the army attempting to defend the place; or, instead of landing in the bay, he might at his option land the main body quite near to Norfolk; and, having possession of James river, he would prevent the arrival of any succor in steamboats or otherwise by that channel.

There are two or three defiles on the route from Lynnhaven bay to Norfolk, caused by the interlocking of streams, that, with the aid of field-works, would possess great strength; and being occupied in succession, would undoubtedly delay, if not repulse, an enemy assailing them in front. Since the naval depot seems fixed at Gosport, these must, indeed, be chiefly relied on for its security from land attacks; and timely attention must be given, on the breaking out of a war, to the occupying of these defiles with appropriate defences. These positions possess no value whatever if they can be turned, and without adequate fortifications at the outlet of Hampton roads, there would seem to be no security for Norfolk or the navy yard, except in the presence of a large military force.

On the completion of the projected defences, the circumstances will be very different. Then, those defiles must be attacked in front, because no part of the enemy's force can be landed above the mouth of the roads. But this is not all. The moment an enemy advances towards Norfolk from this point of debarkation, his communication with his fleet will be jeoparded, because, as the defiles do not require a large body to defend them against an attack in front, the greater part of the reinforcements arriving from above, by way of the river, may be landed upon his flanks, or in his rear. An offensive land movement by the enemy, under such circumstances, could be justified only in the case of his finding an entire want of preparation, caused by the unexpected commencement of hostilities. In connexion with this disposition for defence, it may be expedient on the opening of a war, to throw up a field work on the shore opposite the position of Fort Calhoun, which would, besides, contribute to the exclusion from the roadstead of vessels of small draught.

The above remarks show that the fortifications in progress are not less necessary to the security of the navy yard and the city of Norfolk from a land attack, than from an attack by water, and that both these important functions are superadded to the task of defending the only good roadstead of the southern coast, and of contributing, in a very important degree, towards the defence of the Chesapeake bay.

As in the case of Narraganset roads, it has been objected to this system of defence, that, although it may shut up this anchorage, it leaves others in this region open. May we suppose, then, that if there were no other than this harbor, its defence would be justifiable? If so, it would seem that the objection rests on the principle that in proportion as nature has been bountiful to us, we

must be niggard to ourselves; that, having little, we may cherish it, but, having much, we must throw all away.

The same criticism complains of the unreasonable magnitude of one of these works, (Fort Monroe,) and we concede that there is justice in the criticism. But it has long been too late to remedy the evil. It may not, however, be improper to avail of this opportunity to remove from the country the professional reproach attached to this error. When the system of coast defence was about to be taken up, it was thought best by the government and Congress, to call from abroad a portion of that skill and science which a long course of active warfare was supposed to have supplied. Fort Monroe is one of the results of that determination. It was not easy, probably, to come down from the exaggerated scale of warfare to which Europe was then accustomed; nor for those who had been brought up where wars were often produced, and always magnified by juxtaposition or proximity, to realize to what degree remoteness from belligerent nations would diminish military means and qualify military objects. Certain it is, that this experiment, costly as it was in the case of Fort Monroe, would have been much more so but for the opposition of some whose more moderate opinions had been moulded by no other circumstances than those peculiar to our own country.

The mistake is one relating to magnitude, however, not to strength. Magnitude in fortification is often a measure of strength; but not always, nor in this instance. Fort Monroe might have been as strong as it is now against a water attack, or an assault, or a siege, with one-third its present capacity, and perhaps at not more than half its cost. We do not think this work too strong for its position, nor too heavily armed; and as the force of the garrison will depend mainly on the extent of the armament, the error has caused an excess in the first outlay chiefly, but will not involve much useless expense after completion.

Although there is much important work to be done to complete the fort, it is even now in a state to contribute largely to the defence of the roadstead, and there is no doubt that in a very short time all the casemated parts may be perfectly ready to receive the armament.

This work will be found in statement 1, table C; $223,367 being required to complete it.

Fort Calhoun cannot yet be carried forward for want of stability in the foundation. The artificial mass on which it is to stand having been raised out of the water, the walls of the battery were begun some years since, but it was soon found that their weight caused considerable subsidence. On an inspection by engineer officers, it was then decided to keep the foundations loaded with more than the whole weight of the finished work until all subsidence had ceased. The load had hardly been put on, however, before it was injudiciously determined to take it off and begin to build, although the settling was still going on. Happily a better policy prevailed before the construction was resumed, but not before the very considerable expense of removing the load had been incurred, and the further expense of replacing it rendered necessary. It is hoped the whole load will be replaced early the present year.—(Statement 1, table C.) Required to complete the work $416,000.

It may be expedient, in time of war, by way of providing interior barriers, to erect batteries on Craney island, at the mouth of Elizabeth river, and to put in condition and arm old Fort Norfolk, which is just below the city.

Harbor of St. Mary's.—The central situation (as regards the Chesapeake) of this fine basin, its relation to the Potomac, its depth of water, and the facility with which it may be defended, indicate its fitness as a harbor of refuge for the commerce of the Chesapeake bay, and as an occasional, if not constant, station during war of a portion of the naval force. A survey has been made, but no project has been formed. The engineer department, some years ago, conjec-

tured that the cost of defences in this harbor might amount to $300,000.—(Statement 1, table F.)

Annapolis harbor.—No surveys or plans of defence have been made. The existing works are inefficient and quite out of repair. A former estimate made by the engineer department, amounting to $250,000, is adopted here.—(Statement 1, table F.)

Harbor of Baltimore.—The proximity of the city to Chesapeake bay greatly endangers the city of Baltimore. In the present state of things, an enemy in a few hours' march, after an easy landing, and without having his communication with his fleet seriously endangered, can make himself master of that great emporium of commerce. There are required for its security two forts on the Patapsco—one at Hawkins's Point, and the other opposite that point, at the extreme end of the flat that runs off from Sollers's Point; these being the lowest positions at which the passage of the Patapsco can be defended. Besides the advantages that will result, of obliging the enemy to land at a greater distance—thereby gaining time, by delaying his march, for the arrival of succor, and preventing his turning the defensive positions which our troops might occupy—it will be impossible for him to endanger the city by a direct attack by water.

The present Fort McHenry, Redoubt Wood, and Covington battery should be retained as a second barrier. The first mentioned is now in good condition, and the repairs required for the others may be applied at the beginning of a war.

The fort on Sollers's Point flats, which should be first commenced, is estimated to cost $1,000,000.—(Statement 1, table D.)

The fort on Hawkins's Point, (to be found in statement 1, table F,) will cost, it is supposed, $376,000.

Mouth of Elk river.—The completion of the line of water communication from the Delaware to the waters of the Chesapeake makes it proper to place a fort somewhere near the mouth of Elk river, in order to prevent an enemy from destroying, by a sudden enterprise, the works forming this outlet of the canal. There have been no surveys made with a view to establish such protection, which are estimated at $50,000.—(Statement 1, table F.)

Cities of Washington, Georgetown, and Alexandria.—Fort Washington covers these cities from any attack by water, and will oblige an enemy to land at some eight or ten miles below Alexandria, should that city be his object, and about twice as far below Washington. It will also serve the very important purpose of covering troops crossing from Virginia with a view to fall on the flanks of an enemy moving against the capital from the Patuxent or the Chesapeake. To put the necessary repairs on Fort Washington will cost about $20,000.—(See statement 1, table A.)

Cedar Point, Potomac river.—But all these objects would have been better fulfilled had the work been placed at Lower Cedar Point. As it is, however, the contemplated works being constructed in the Patuxent, and the militia of the surrounding country in a due state of preparation, an enterprise against Washington would be a hazardous one.

As giving complete security to the towns in the District, covering more than sixty miles in length of the Potomac, and a large tract of country lying between the Potomac and the Patuxent, the work on Cedar Point should not be omitted. There have been no surveys made of the ground, nor projects of the fort, which, in a conjectural estimate of the engineer department, was set down at $300,000.—(Statement 1, table E.)

Patuxent river.—The more effectually to protect the city of Washington from a sudden attack by troops landed at the head of navigation in the Patuxent, and to provide additional shelter for vessels in the Chesapeake, a fort has been planned to occupy Point Patience, and another to occupy Thomas's Point, both a short distance up the river. The work on Thomas's Point is (in statement 1,

table D) estimated to cost $250,000; and the work on Point Patience, (in statement 1, table F,) estimated to cost $246,000.

It will be perceived that the system of defence for Washington contemplates, first, defending the Potomac on Cedar Point and maintaining a second barrier at Fort Washington; second, defending the mouth of the Patuxent. This system is criticised in the document before referred to in a way to induce the suspicion that it was not understood.

During the last war there was no fort in the Patuxent; and the consequence was, that the British approached by that avenue and occupied the whole river as high as Pig Point—nearly fifty miles from its mouth, and less than twenty miles from the capital; while, in consequence of there being no forts in the Potomac, they occupied that river as high as Alexandria, inclusive; by this latter occupation perfectly protecting the left flank of the movement during its whole advance and retreat. Both flanks being safe, the British had nothing to fear except from a force in front; and that this risk was not great, in the short march of less than twenty miles from his boats, was proved by the issue.

On the ninth day from that on which the fleet entered the Chesapeake the English army was in possession of the capital, having penetrated near fifty miles beyond the point of debarkation. On the twelfth day from the time of landing, the troops were again on shipboard near the mouth of the river. This attack, exceedingly well conceived and very gallantly executed, owed its success entirely to the want of defences, such as are now proposed.

Let us suppose both rivers fortified as recommended, and an enemy landed at the mouth of the Patuxent. If now he attempt this enterprise his march will be prolonged by at least four days; that is to say, it will require more than sixteen days, during which time he will be out of communication with his fleet, as regards supplies and assistance.

The opposition to his invasion will begin at the landing, because our troops having now nothing to fear as to their flanks, either from the Potomac or Patuxent, will dispute every foot of territory; and although he should continue to advance, it must be at a slower rate.

While he is thus pursuing his route towards Washington, the forces of Virginia will be crossing the Potomac and concentrating at Port Tobacco, or some position between that place and Fort Washington, preparatory to falling on his flank and rear. This would seem to be conclusive; for it is difficult to conceive of troops persevering in an expedition when every moment will not only place them further from succor, but greatly increase their need of it. Railroads reach from near the crossing places of the Potomac to the very heart of the country south; and a very few days would bring forward a large force, all of which would arrive upon the rear of the enemy.

It is said in the criticism that, if shut out of the Patuxent, the enemy might land between the mouth of that river and Annapolis, and thence proceed against Washington. But the same difficulties belong to this project, and a new difficulty is added. The Virginia forces arrive, as before, and assail his flank either between the Potomac and Patuxent, or between the Patuxent and the Chesapeake; and there is, besides, the Patuxent for the enemy to cross both in going and returning—itself a formidable military obstacle.

It is said, also, that the landing may be made in the Potomac; but this only proves that the system animadverted on had not been studied, it being a fundamental principle of the system that such landing must be prevented by fortifying the rivers as low down as possible.

The southern coast, stretching from Cape Hatteras to the southern point of Florida, is invariably low, and for the greater part sandy; much resembling the coast from the above-mentioned cape to Montauk Point, on the east end of Long Island.

A ridge of sand, here and there interrupted by the alluvion of the rivers, ex-

tends through its whole length. This ridge, in certain portions, lies on the main land, while in others it is divided therefrom by basins or "sounds" of various width and depth, and is cut up into islands by numerous channels which connect these interior waters with the sea. Wherever this sand ridge is interrupted, its place is occupied by low and marshy grounds, bordering the principal and the many lesser outlets of the rivers.

Ocracock inlet, N. C.—The shallowness of the water on the bars at this inlet effectually excludes all vessels-of-war—at least, all moved by sails. But as this is an outlet of an extensive commerce, and as, through this opening, attempts might be made in small vessels, barges, or the smaller class of steam vessels, to destroy this commerce, or to interrupt the line of interior water communication, timely preparation must be made of temporary works equal to defence against all such minor enterprises.

Beaufort harbor, N. C.—A work called Fort Macon has been erected for the defence of this harbor, which will require some repairs. Some operations are also called for to protect the site from the wearing action of the sea. (Statement 1, table A.) Estimate, $10,000.

Mouths of Cape Fear river, N. C.—The defence of the main channel of Cape Fear requires, in addition to Fort Caswell, (now nearly completed,) on Oak island, another fort on Bald Head. And the defence of the smaller channel will require a redoubt on Federal Point. The battery magazine, block-house, &c., at Smithville, should remain as accessories. *Fort Caswell*, Oak island, (statement 1, table C,) requires $6,000 to complete it; the *fort on Bald Head* (statement 1, table F) will require $180,000; the *redoubt on Federal Point* (statement 1, table F) will require $18,000; and the battery, &c., called *Fort Johnston*, at Smithville, (statement 1, table A,) $5,000.

Georgetown harbor, S. C.—The first inlet of any consequence south of Cape Fear river is at the united mouths of the Waccamaw, Pedee, and Black rivers, forming Georgetown harbor; which is a commodious and capacious bay, having sufficient water within, and also upon the bar near the mouth, for merchant vessels and small vessels-of-war. A survey of this harbor was begun many years ago, but never completed, and no projects for defence have been made. It is probable that a work placed near Moscheto creek, or on Winyaw Point, would give adequate strength, at the cost of about $250,000.—(Statement 1, table E.)

Santee river and Bull's bay.—About ten miles south from Georgetown are the mouths of the Santee, the largest river in South Carolina. It is not known whether the bars at the mouths of this river have sufficient water for sea-going vessels. The same uncertainty exists as to the depth into Bull's bay. It may be sufficient to consider these and the other inlets between Georgetown and Charleston as calling for small works capable of resisting boat enterprises, and to assign as the cost $100,000. Should they prove to be navigable for privateers they will require a larger expenditure.—(Statement 1, table F.)

Charleston, S. C.—This city, situated at the junction of Ashley and Cooper rivers, is about five miles, in a direct line from the sea. Between it and the ocean there is a wide and safe roadstead for vessels of any draught. Upon the bar, lying three or four miles outside of the harbor, there is, however, only water enough for smaller frigates and sloops-of-war. On the southwest side of the harbor is James's island, in which are several serpentine passages, more or less navigable for boats, barges, and small steam vessels; some of them communicate directly with the sea and Stono river. Whappoo cut, the most northerly passage from the Stono to Charleston harbor, enters Ashley river opposite the middle of the city.

Interior natural water communications exist, also, to the southwest of Stono river, connecting this with North Edisto river; the latter with South Edisto

and St. Helena sound; this again, with broad river; and, finally, this last with Savannah river.

On the north side of the harbor of Charleston lies Sullivan's island, separated from the main by a channel navigable only by small craft. On the northwest side of this island is an interior water communication, which extends to Bull's bay, and even beyond, to the harbor of Georgetown.

From this sketch it is apparent that it will not do to restrict the defences to the principal entrance of the harbor. The lateral avenues must also be shut. And it is probable that accurate surveys of all these avenues will show that the best mode of defending them will be by works at or near the mouths of the inlets, as the enemy will be kept thereby at a greater distance from the city; the lesser harbors formed by these inlets will be protected, and the line of interior water communication will be inaccessible from the sea.

No position for the defence of the principal entrance to Charleston harbor can be found nearer to the ocean than the western extremity of Sullivan's island. This is, at present, occupied by Fort Moultrie—a work of some strength, but by no means adequate to its object, its battery being weak, and the scarp so low as to oppose no serious obstacle to escalade. How far this work, by a modification of its plan and relief, may be made to contribute to a full defence of the harbor, has not yet been determined. But so long as it is the only work at this, the principal point of defence, it must be kept in good condition for service; and no alterations that will disturb this efficiency should be undertaken. The repairs now indispensable will cost $10,000.—(Statement 1, table A.)

On a shoal nearly opposite to Fort Moultrie the foundation of a fort has been begun, which will have a powerful cross-fire with Fort Moultrie. This is called Fort Sumter. (Statement 1, table C.) To complete this work will require, it is estimated, $286,000.

In the upper part of the harbor is Castle Pinckney, on Shuter's Folly island. This requires some repairs, estimated at $7,000.(—Statement 1, table A.)

Stono, North Edisto, and South Edisto.—All these must be fortified, at least in such a manner as to protect these inlets from enterprises in boats or small vessels. To that end, $50,000 may be assigned to each.—(Statement 1, table F.)

St. Helena sound.—The proper defences cannot be pointed out till the sound shall have been surveyed. Although there is supposed to be no great depth of water on the bar, it is known to be navigable for the smaller class of merchantmen and for steamboats, and to have a navigable communication with the head of Broad river, or Port Royal, intersecting the interior navigation between Charleston and Savannah. The estimate is $150,000.—(Statement 1, table F.)

Broad river, or Port Royal roads.—The value of this capacious roadstead as a harbor of refuge depends on the depth that can be carried over the bar; on the distance of this bar beyond the line of coast, and on the means that may be applicable of lessening the danger of crossing it. This is supposed to be the deepest bar on the southern coast. Should there prove to be water enough for frigates, and should it be practicable to make the passage over the bar safe and easy, by the erection of light-houses on the shore and lights, or other distinct guides on the bar, this harbor, situated within sixty miles of the city of Charleston and twenty of Savannah river, intersecting the interior water communication between these cities, thereby securing the arrival of supplies of every kind, would possess a high degree of importance, not only as a harbor of refuge, but also as a naval station.

The survey of the exterior shoals, constituting the bar, should be made with the greatest care and all possible minuteness. Only when this shall have been done can the true relation of this inlet to the rest of the coast be known, and on this relation the position and magnitude of the required defences will depend. For the present, the estimate made some years ago by the engineer department is adopted, namely, $300,000.—(Statement 1, table E.)

Savannah, and mouth of Savannah river, Georgia.—Mention has been made of the natural interior water communication along the coast of South Carolina. A similar communication extends south from the Savannah river as far as the St. John's, in Florida. Owing to these passages the city of Savannah, like Charleston, is liable to be approached by other avenues than the harbor or river, and accordingly its defences must have relation to these lesser as well as great channels.

The distance from the mouth of Wassaw sound, or even Ossabaw sound, (both to the southward of Savannah river,) to the city is not much greater than from the mouth of the river, and an enterprise may proceed the whole distance by water, or part of the way by water and part by land, from either inlet or from both. As in the case of like channels in the neighborhood of Charleston, it cannot now be determined where they can be defended most advantageously. It is hoped, however, that the localities will permit the defences to be placed near the inlets, because thus placed they will serve the double purpose of guarding the city of Savannah and covering these harbors, which, in time of war, cannot but be very useful.

The defence of Savannah river is not difficult. A fort on Cockspur island, lying just within the mouth, and perhaps for additional security another on Tybee island, which forms the southern cape at the mouth of the river, would prevent the passage of vessels up the channel and cover the anchorage between Tybee and Cockspur.

Old Fort Jackson, standing about four miles below the city, should be maintained as a second barrier, both as respects the main channel and the passages which come into the river from the south, which last would not at all be controlled by works on Cockspur or Tybee. Fort Pulaski, on Cockspur island, is well advanced, and to a certain extent is even now efficient, measures being now in hand for mounting the lower tier of guns; $215,000 are required to complete the works and the outworks and appendages.—(Statement 1, table C.) To fortify Tybee island may require $120,000, (statement 1, table E,) and to repair Fort Jackson $50,000.—(Statement 1, table A.)

Wassaw sound, Ossabaw sound, St. Catharine's sound, at the mouth of Medway river; Sapelo sound, Doby inlet, Altamaha sound, at the mouth of Altamaha river; St. Simon's sound, at the mouth of Buffalo creek; St. Andrew's sound, at the united mouths of the Scilla and Santilla rivers; and Cumberland sound, at the mouth of St. Mary's river.—All these communications with the ocean are highly important as regards the line of interior navigation, and several of them as affording access to excellent harbors. The last, and one or two others, are known to be navigable to the largest sloops-of-war and merchantmen, and some of the others are but little inferior, as regards depth of entrance or safety of anchorage.

All these openings have yet to be surveyed; some of them are probably easily defensible by forts and batteries, while others may require the aid of floating defences.

It is an important principle, bearing peculiarly on the defence of the whole southern coast, that on a shore possessing few harbors it is at the same time more necessary to preserve them all for our own use, and more easy to deprive an enemy of that shelter without which a close blockade cannot be maintained. This principle is enforced in the instance of our southern coast by the two following weighty considerations, namely: first, its remoteness from the nearest naval rendezvous, the Chesapeake, which is on a mean 600 miles distant, and to leeward both as to wind and current; and second, its being close upon the larboard hand as they enter the Atlantic of the great concourse of vessels passing at all seasons through the Florida channel. While, therefore, this part of the coast, from the concentration of vessels here, is in great need of protection

of some sort, naval aid can be extended to it only with difficulty, and at the risk of being cut off from all retreat by a superior enemy.

Accurate and minute surveys, which will enable our vessels, whether pursued by an enemy or suffering by stress of weather, to shun the dangers which beset the navigation of these harbors, and properly arranged defences to cover them when arrived, seem to be indispensable.

When these harbors shall be fortified, the operation of investing the coast and watching the great outlet of commerce through the Florida passage will be a difficult and hazardous one to an enemy, to whom no perseverance or skill can avail to maintain a continuous blockade, while, on the part of our small vessels-of-war, steam frigates, and privateers, the same sort of supervision will be at all times easy and safe.

Nothing better can now be done than to assume $200,000 as the average cost of defending each of the nine entrances; giving a total of $1,800,000.—(Statement 1, tables E and F.)

St. Augustine, Florida.—This, the most southern of the harbors on the Atlantic, and the key to the eastern portion of Florida, is accessible to the smaller class of merchantmen, to privateers, and to steam vessels, and requires a certain amount of protection from attacks by war. It is, therefore, proposed to put that part of the old Spanish fort (Fort Marion) that commands the harbor in a serviceable state, which will require $50,000.—(Statement 1, table A.)

Having now passed along the whole Atlantic coast, from Passamaquoddy to Cape Florida, pointed out every harbor of any consequence, and specified every work that a thorough system of defence will require, we will, in order to give a comprehensive view of the number, cost, armament, and garrisons of the works, refer to statement 1, accompanying this report. In that statement the works are divided into tables, showing separately, 1st, (table A,) the old works already repaired and those proposed to be repaired and retained in the system of defence; 2d, (table B,) new works completed; 3d, (table C,) works under construction; 4th, (table D,) works to be first commenced; 5th, (table E,) works to be commenced next after those in table D; 6th, (table F,) works to be last commenced.

The most essential works on the Atlantic coast are included in the first five tables, and, it appears from the recapitulation, that for these there will be required, for garrisons, in time of war, 28,720 men; for the armament, 5,748 pieces of ordnance of every kind; and for the expense yet to be incurred, $9,476,767.

We consider it to be our duty to estimate for the last class of works also, (table F,) although it must be a long time before permanent works for these positions can be commenced. For these there will be required, in addition, for war garrisons, 25,545 men; for armament, 4,790 pieces of ordnance; and for the expense of erection, $14,241,824.

It must be here stated that, as to a few of the works in table F, fuller information may require them to be elevated into some of the earlier classes.

SEA-COAST FROM CAPE FLORIDA TO THE MOUTH OF THE SABINE.

The first positions that present themselves, on doubling around Cape Florida into the Gulf of Mexico, are *Key West* and *the Dry Tortugas*.

This board concur in the opinions heretofore expressed in favor of these fine harbors, and they beg leave to refer, for very interesting statements, in relation to the latter harbor especially, to a letter from Commodore Rodgers to the Secretary of the Navy, July 3, 1829, (Senate documents, 1st session 21st Congress, vol. 1, No. 1, page 236,) and letter from the Secretary of the Navy, March 25, 1830, (Senate documents, 1st session 21st Congress, vol. 2, No. 111, page 1.)

A naval force, designed to control the navigation of the Gulf could desire no

better position than Key West or the Tortugas. Upon the very wayside of the only path through the Gulf, it is at the same time well situated as to all the great points therein. It overlooks Havana, Pensacola, Mobile, the mouths of the Mississippi, and both the inlet and outlet of the Gulf.

The Tortugas harbors in particular are said to afford perfect shelter for vessels of every class, with the greatest facility of ingress and egress. And there can be no doubt that an adversary in possession of large naval means would, with great advantage, make these harbors his habitual resort and his point of general rendezvous and concentration for all operations on this sea. With an enemy thus posted, the navigation of the Gulf by us would be imminently hazardous, if not impossible, and nothing but absolute naval superiority would avail anything against him. Mere military means could approach no nearer than the nearest shore of the continent.

It is believed that there are no harbors in the Gulf at all comparable with these that an enemy could resort to with his larger vessels. To deprive him of these would therefore be interfering materially with any organized system of naval operations in this sea. The defence of these harbors would, however, do much more than this. It would transfer to our own squadron, even should it be inferior, these most valuable positions, and it would afford a point of refuge to our navy and our commerce at the very spot where it would be most necessary and useful.

In this report, already too much extended, we forbear to enlarge on this topic, merely adding that the complete and certain defence will not be difficult. By occupying two, or at most three, small islands, the harbors of the Dry Tortugas (there being an inner and an outer harbor) may be thoroughly protected. The works must be adequate to resist escalade, bombardment, and cannonade from vessels, and to sustain a protracted investment; but as they will not be exposed to any operation resembling a siege, there can be no difficulty in fulfilling the conditions. They must have capacious store-rooms, be thoroughly bomb-proof, and be heavily armed.

The fortification of Key West should be of a similar character.

No details can be given until all these positions have been minutely surveyed with reference to defence.

The sum of $3,000,000 was, some years ago, assumed by the engineer department as necessary to provide defences for the Tortugas and for Key West, and this estimate may now be taken as ample.—(Statement 2, table F.)

Turning now to the shore of the Gulf, we find a portion, namely, from Cape Florida to Pensacola, that has never been examined with particular reference to the defence of the harbors. Within this space there are *Charlotte harbor*, *Espiritu Santo bay*, *Apalachicola bay*, *Apalachie bay*, *St. Joseph's bay*, and *Santa Rosa bay*. Nothing better can now be done than to assume for these the estimate formerly presented by the engineer department, viz: $1,000,000 for all.—(Statement 2, table F.)

It may be remarked, as applying to the whole Gulf coast, that, from the relative geographical position of this part of the seaboard, and the country interested in its safety, from the unhealthiness of the climate, nature of the adjacent country, and mixed character of the inhabitants, it will be some time before that portion within supporting distance, whose welfare may be endangered by an enemy, will be competent, of itself, to sustain a serious attack from without. Upon the Atlantic seaboard the Alleghanies crowd the people down upon the shore, every important point on the coast being surrounded by a population dense now and every day rapidly increasing in numbers, while the ocean and the interior parallel communications transmit rapid aid to the right and left. The coast of the Gulf, however, is thinly peopled in itself, is remote from succor from behind, and is almost inaccessible to lateral assistance. Those reasons, therefore, which tend to establish the necessity of an organized, permanent,

and timely system of defence for the whole seaboard of the United States, apply to this part of it with peculiar force.

We now pass on to the remaining points of defence on the Gulf.

Pensacola bay.—The upper arms of this considerable bay receive the Yellow Water or Pea river, Middle river, and Escambia river. The tributaries of the last, interlocking with the Alabama and the Chattahoochie, seem to mark the routes whereby, at some future day, canals will convey a part of the products of these rivers to Pensacola, while the qualities and position of the harbor and the favorable nature of the country have already marked out lines of railroad communication with a vast interior region.

Santa Rosa sound extends eastward, from the lower part of the bay, into Santa Rosa bay. On the west the lagoons of Pensacola, Perdido, and Mobile bays, respectively, interlock in such a manner as to require but a few miles of cutting to complete a navigable channel from the first to the last named bay, and thence, through an existing interior water communication, to the city of New Orleans.

Pensacola bay has rare properties as a harbor. It is now accessible to frigates, and there is reason to hope that the bar may be permanently deepened. The bar is near the coast, and the channel across it straight and easily hit. The harbor is perfectly landlocked, and the roadstead very capacious. There are excellent positions within for repairing, building, and launching vessels, and for docks and dock yards in healthy situations. The supply of good water is abundant. The harbor is perfectly defensible. These properties, in connexion with the position of the harbor as regards the coast, have induced the government to select it as a naval station and place of rendezvous and repair.

An excellent survey has been made of the bay of Pensacola, sufficing to form the scheme of defence for the town and harbor. Regarded, however, as an important naval station and place of rendezvous and repair, which it now is, further surveys, extending a greater distance back from the shores, delineating accurately the face of the country and showing the several avenues by land and water, are found to be necessary.

The defences of the water passage, as projected, are nearly complete, $22,000 being asked to finish them. A work is just begun at the position of the Barrancas. It is indispensable, in connexion with one or two other small works designed to cover the navy yard from a lateral attack through the western bays. The Barrancas work may require $100,000, and the others $200,000; making a total for Pensacola of $322,000.—(Statement 2, tables A, C, and F.)

Perdido bay.—This bay is intimately related to Pensacola and Mobile bays, both as regards security and intercommunication, and should be carefully surveyed with a view to these objects. It must be fortified, and the cost may be $200,000.—(Statement 2, table F.)

Mobile bay.—The plan of defence for this bay comprises a fort (now needing some repairs) for Mobile Point. Another fort is projected for Dauphin island, and a tower for the defence of Pass-au-Heron. The estimates for all require $915,000.—(Statement 2, tables A, E, and F.)

New Orleans and the delta of the Mississippi.—The most northern water communication between the Mississippi and the Gulf is by the passage called the Rigolets, connecting Lake Borgne and Lake Pontchartrain. The next is the pass of Chef Menteur, also connecting these lakes. Through these passages an enemy, entering Lake Pontchartrain, would, at the same time that he intercepted all water communication with Mobile and Pensacola, be able to reach New Orleans from the southern shore of the lake; or he might continue onward through Lake Maurepas, Amité river, and Iberville river, thereby reaching the Mississippi at the very head of the delta; or, landing within the mouths of the Chef Menteur, he might move against the city along the ridge of the Gentilly road.

To the southwest of Chef Menteur, and at the head of Lake Borgne, is Bayou Bienvenue, a navigable channel, (the one followed by the English army in the last war,) not running quite to the Mississippi, but bounded by shores of such a nature as to enable troops to march from the point of debarkation to the city.

These avenues are defended by Fort Pike at the Rigolets; by Fort Wood at Chef Menteur; by a small fort at Bayou Bienvenue, and by a tower at Bayou Dupré.

The defences of the Mississippi are placed at the Plaquemine turn, about seventy miles below New Orleans—the lowest position that can be occupied. Fort Jackson is on the right bank, and Fort St. Philip, a little lower down, on the left.

All these forts have been abandoned for several years, and, having received no attention in the way of timely repairs, now require repairs somewhat extensive, especially Forts Jackson and St. Philip, on the Mississippi. The following sums, it is believed, will be required to place all these works in perfect order, viz: Fort Pike, $5,000; Fort Wood, $3,580; fort on Bayou Bienvenue, $2,500; Tower Dupré, $400; Fort Jackson, $20,000, and Fort St. Philip, $3,300.—(Statement 2, table A.)

The most western avenue by which New Orleans is approachable from the sea passes on the west side of the island of Grande Terre into Barrataria bay, which is an excellent harbor for a floating force guarding the coasting trade on that side of the Mississippi. From this bay there are several passages leading to New Orleans. The estimate for a work which is now about to be begun on Grande Terre island is $325,000,—(Statement 2, table C.)

Several times in this report we have alluded to circumstances which would demand the employment of floating defences, in addition to fixed defences upon the shore. We have here an instance in which that kind of defence would be very useful. Fortifications will enable us to protect New Orleans even from the most serious and determined efforts of an enemy; but, owing to the great width of some of the exterior passages, we cannot, by fortification alone, deprive an enemy of anchorages, (especially that of Chandeleur island,) nor cover entirely the exterior water communication between the Rigolets and Mobile. We must, therefore, either quietly submit to the annoyance and injury that an enemy in possession of these passages may inflict, or avert them by a timely preparation of a floating force adapted to their peculiar navigation, and capable, under the shelter of the forts, of being always on the alert, and of assuming an offensive or defensive attitude, according to the designs, conduct, or situation of the enemy.

Our examination of the coast from Cape Florida to the Sabine having now been completed, we will, as in the case of the Atlantic coast, refer, for a comprehensive view of the number, cost, armament, and garrison of the works, to statement 2, wherein the works are divided into tables similar to those of statement 1.

The more essential works on the Gulf coast, included in the first five tables, will require for garrison, in time of war, 4,420 men; for the armament, 794 pieces of ordnance of every kind; and for the expense yet to be incurred, $516,780.

The works comprised in the last table (F) are generally such as may be postponed to a late day. But among them have been placed some (as, for example, those for Tortugas and Key West) as to which the examination has not been sufficiently minute to decide to what class they really appertain.

In this age of great improvements in the means of locomotion, it would be unwise to decide, without pressing need, on the details of the floating force required at certain points on the Atlantic and Gulf of Mexico coasts—perhaps even on the nature of the moving power. Although the probability undoubtedly

is, that the power will be steam, genius may, in the interim, devise something still better than steam.

And we may here remark, in relation to the preparation of steam vessels for warlike purposes generally, that wisdom would seem to direct a very cautious and deliberate progress. Every new vessel may be expected to surpass, in important particulars, all that had preceded; and, to surpass the more, as each succeeding vessel should be the result of careful study and trial of the preceding.

It may be considered unreasonable to expect that steam itself will give way to some agent still more potent, and at the same time not less safe and manageable. But it certainly is no more than probable that steam vessels now under construction may be regarded almost as incumbrances within ten years.

A *deliberate* advance in this branch of naval construction is recommended the more by our ability to construct these vessels in large numbers when needed, the timber being collected in the meantime.

Referring now to the tables which accompany this report:

Statement 1 includes all works from Passamaquoddy to Cape Florida; statement 2, all works from Cape Florida to the mouth of the Sabine; each statement comprising six tables, as before mentioned.

In relation to every work executed, in progress, or merely projected, the tables show the garrison, the ordnance of every description, the sums already expended, and the final cost.

As to works not yet planned, a portion of the same particulars are exhibited, founded on conjecture merely; of course, without laying claim to accuracy, but still as approximations, affording some indication of the final result.

It may be well to give here a summary of all these tables.

The works which are likely to be erected on the Atlantic, within a reasonable time, and which are regarded as necessary to a good system of defence, will require war garrisons, amounting to 28,720 men; and they will require a further expenditure of $9,176,767. Works called for in like manner upon the Gulf of Mexico coast will need 4,420 men to garrison them, and a further expenditure of $516,780. Of the *whole coast*, therefore, the garrisons will amount to 33,140 men, and the expenditures to $9,993,547.

The remaining works comprised in table F, of both statements, will require 30,695 men, and cost $19,521,824.

Making the grand total for the whole sea-coast of the United States in garrisons for the works 63,835 men, and in cost $29,515,371.

In addition to these statements as to the fortifications, there are two corresponding statements of the cost of the ordnance, of the carriages, and of a certain supply of powder and shot or shells for each piece, one statement relating to the Atlantic coast, and the other to the Gulf of Mexico coast. From these it appears that for the works likely to be erected on the Atlantic coast, within a reasonable time, (that is to say, for the works comprised in the first five tables, A, B, C, D, and E,) there will be needed 2,483 pieces of ordnance, and 4,511 carriages, which will cost $2,252,290.

For similar works on the Gulf of Mexico coast, there will be needed 296 pieces of ordnance, and 495 carriages, at a cost of $240,720.

The remaining works named in tables F, of both statements, will require, in addition, 5,447 guns and 5,554 carriages, which will cost $3,735,330.

Making the grand total required for the whole sea-coast 8,226 guns and 10,560 carriages, at a cost of $6,228,340.

The time required to construct and put in order the whole system must depend on the amount of the annual appropriation. All that need now be said on the subject is, that in an undertaking necessarily involving so much time, and of such vital importance, there should be no relaxation of diligence. With all diligence, many years must necessarily be consumed. But the work may be

too much hurried, as well as too much delayed. There is a rate of progress at which it will be executed in the best manner, and at the minimum cost. If more hurried it will be defective in quality, and more costly if delayed.

France was at least fifty years completing her maritime and interior defences.

In the report presented by the engineer department, in March, 1836, (Senate document, 1st session 24th Congress, vol. 4, No. 293,) there is a demonstration of the actual economy that will result from an efficient system of sea-coast defence, which is to the following effect, referring to the document itself for details.

There is first supposed to be an expedition of 20,000 men at Bermuda or Halifax ready to fall upon the coast. This will make it necessary, if there be no fortifications, to have ready a force at least equal at each of the following points, namely: 1st. Portsmouth and navy yard. 2d. Boston and navy yard. 3d. Narraganset roads. 4th. New York and navy yard. 5th. Philadelphia and navy yard. 6th. Baltimore. 7th. Norfolk and navy yard. 8th. Charleston, South Carolina. 9th. Savannah; and 10th. New Orleans; to say nothing of other important places.

At each of these places, except the last, 10,000 men drawn from the interior, and kept under pay, will suffice, the vicinity being relied on to supply the remainder. At New Orleans, 17,000 men must be drawn from a distance. In a campaign of six months, the whole force will cost at least $26,750,000.

The garrisons necessary to be kept under pay for the fortifications in these places will cost for the same time $8,430,500. The difference ($18,319,500) will then be only $3,448,156 less than the whole expense of building these defences, viz: $21,767,656. Whence it follows that the expense of these erections would be nearly compensated by the saving they would cause in a single campaign.

All which is respectfully submitted.

For the board:

JOS. G. TOTTEN,
Colonel of Engineers.

STATEMENTS RELATING TO THE DEFENCES OF THE COAST FROM THE PASSAMAQUODDY TO THE SABINE.

No. 1.—*Of the fortifications constructed, constructing, or repairing, and of those proposed to be constructed or repaired for the defence of the sea-coast, from Passamaquoddy bay to Cape Florida.*

Classification.	Designation of the works.	Garrison in war.	ARMAMENT.															Expended.	Required to complete.	Total cost of repairs or construction.
			42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Carronades.	8-inch howitzers, heavy.	8-inch howitzers, light.	13 inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total.			
	A.—*Old works repaired, and those proposed to be repaired, with the amounts expended, and the amounts required to put them in a serviceable condition.*																			
1	Fort Sullivan, Eastport, Maine	180	.....	5	21	....	....	3	....	4	....	1	2	..	....	....	....	36	....	$10,000	$10,000
2	Fort Edgecomb, Wiscasset, Maine	60	.....	.....	12	....	....	....	....	....	....	....	....	....	....	....	....	12	....	5,000	5,000
3	Fort Preble, Portland harbor, Maine	100	.....	8	.....	....	3	3	....	5	....	2	2	....	....	....	....	23	$5,086	3,200	*8,286
4	Fort Scammel, House island, Portland, Maine	80	.....	.....	8	....	....	3	....	3	....	1	2	....	....	....	....	17	440	3,400	*3,840
5	Fort McCleary, Portsmouth, N. H	80	.....	5	.....	....	....	6	....	4	....	..	..	....	....	....	....	15	1,590	750	*2,740
6	Fort Constitution, N. H	250	.....	21	12	....	....	6	....	7	....	2	4	....	....	....	....	52	2,590	3,671	*6,261
7	Fort at Gloucester, Mass	80	.....	8	.....	....	....	3	....	2	....	....	2	....	....	....	....	15	.....	10,000	*10,000
8	Fort Pickering, Salem, Mass	60	.....	.....	6	..	....	3	....	1	....	1	....	....	....	....	....	11	.....	5,000	*5,000
9	Fort Lee, Mass	40	.....	8	.....	....	....	....	....	....	....	....	....	....	....	....	....	8	.....	2,000	2,000
10	Fort Sewall, Marblehead, Mass	125	.....	.....	18	....	.. ..	3	....	2	....	....	2	....	....	....	....	25	.....	10,000	*10,000
11	Fort Independence, Boston, Mass	500	6	49	25	....	....	....	20	15	....	2	4	....	....	....	....	121	229,594	230,000	459,594
12	Fort Winthrop, Governor's island, Boston, Mass.	.....	.....	.....	16	....	....	....	....	....	....	....	2	....	....	....	....	18	.....	100,000	100,000
13	Westhead battery, Governor's island, Boston, Mass	150	.....	7	.....	...	.....	....	....	....	....	....	....	....	....	....	....	7	.....	5,000	5,000
14	Southeast battery, Governor's island, Boston, Mass	.....	7	.....	.....	....	....	....	....	....	....	1	2	....	....	....	....	7	.....	5,000	5,000
15	Fort at New Bedford, Mass	60	.....	.....	9	....	....	....	....	7	....	..	2	....	....	....	....	12	.....	5,000	*5,000
16	Fort Wolcott, Newport, R. I	200	.....	.....	34	....	....	....	....	....	....	..	2	....	....	....	....	43	.....	10,000	10,000
17	Fort Green, Newport, R. I	40	.....	.....	8	....	....	....	....	....	....	....	....	....	....	....	....	8	.....	2,000	2,000
18	Fort Hale, New Haven, Conn	30	.....	..	6	....	....	....	....	....	....	....	....	....	....	....	....	6	.....	5,000	*5,000
19	Fort Columbus, Governor's island, N. Y	.....	.....	53	96	....	....	....	4	8	....	2	12	....	....	....	....	105	.....	1,662	216,619
20	Castle Williams, Governor's island, N. Y	800	26	23	16	....	....	....	....	4	....	..	....	....	....	....	....	73	205,729	5,735	
21	South battery, Governor's island, N. Y	....	.....	5	5	....	....	....	....	4	....	..	....	....	....	....	....	14	.....	3,500	

23	Fort Gibson, Ellis's island, N. Y	80	10	.....	.....	....	....	....	....	2	....	1	2	....	....	....	....	15	.....	10,000	10,000
23	Fort Wood, Bedlow's island, N. Y	300	16	26	.....	2	....	6	....	8	....	2	....	....	....	....	....	60	.....	150,000	150,000
24	Fort Richmond, Staten island, N. Y	.....	27	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	27			
25	Fort Tompkins, Staten island, N. Y	.....	.....	.....	32	....	2	....	10	7	....	4	8	....	....	....	1	64		450,000	†450,000
26	Battery Hudson, Staten island, N. Y	1,000	40	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	40			
27	Battery Morton, Staten island, N. Y	.....	9	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	9			
28	Fort Mifflin, Delaware river, Penn	200	.....	.....	28	....	..	....	....	8	....	4	4	....	....	....	....	44	76,783	.....	‡76,783
29	Fort McHenry, Baltimore, Md	350	19	11	20	....	....	6	....	7	....	2	7	....	....	....	2	74	140,000	.....	‡140,000
30	Fort Madison, Annapolis, Md	80	.....	6	.....	....	....	3	....	4	...	1	4	....	....	....	....	18	....	5,000	5,000
31	Fort Severn, Annapolis, Md	60	.....	.....	7	....	....	3	....	2	....	....	2	....	....	....	....	14	.....	5,000	5,000
32	Fort Johnston, Cape Fear river, N. C	60	.....	.....	10	....	....	....	....	....	....	....	....	....	....	....	....	10	.....	5,000	5,000
33	Castle Pinckney, Charleston, S. C	50	8	.....	.....	..	....	....	....	..	....	....	1	....	....	....	....	9	37,114	7,000	44,114
34	Fort Moultrie, Charleston, S. C	300	.....	30	.....	3	9	6	....	5	...	1	....	....	....	....	....	54	.....	10,000	10,000
35	Beaufort battery, S. C	30	.....	.....	6	....	....	....	....	....	....	....	....	....	....	....	....	6	.....	5,000	5,000
36	Fort Jackson, Savannah river, Georgia	70	.....	.....	10	....	...	3	....	1	....	....	....	....	....	....	....	14	.....	50,000	50,000
37	Fort Marion, St. Augustine, Fla	30	.....	.....	6	....	....	....	....	....	....	....	....	....	....	....	....	6	.....	50,000	50,000
38	Fort Hamilton, New York harbor, N. Y	.....	.....	.....	.....	....	.	....	....	....	....	....	....	....	....	....	....	.....	.....	20,000	‖20,000
39	Fort Lafayette, New York harbor, N. Y	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	5,000	‖5,000
40	Fort Washington, Potomac river, Md	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	20,000	‖20,000
41	Fort Macon, Beaufort, N. C	.....	.....	... ..	.....	....	....	....	....	....	....	....	....	....	....	..	....	.....	.....	10,000	‖10,000
		5,445	168	268	343	5	14	57	34	114	...	27	64	....	....	....	3	1,097	699,319	1,227,918	1,927,237
	B.—New works completed.																				
1	Fort Hamilton, New York harbor, N. Y	800	14	18	.....	5	5	6	48	8	....	2	4	....	2	1	5	118	479,236	.....	479,236
2	Fort Lafayette, New York harbor, N. Y	370	24	24	18	....	2	2	....	6	..	....	....	....	....	....	....	76	318,305	.....	318,305
3	Fort Washington, Potomac river, Md	400	.....	.....	66	....	....	3	...	7	....	....	2	...	2	....	....	80	454,103	.....	454,103
4	Fort Macon, Beaufort, N. C	300	.....	12	15	4	4	3	14	6	....	..	2	...	...	....	2	62	349,500	.....	349,500
		1,870	38	54	99	9	11	14	62	27	...	2	8	....	4	1	7	336	1,601,144	.....	1,601,144
	C.—Works under construction.																				
1	Fort Warren, George's island, Boston, Mass	1,500	64	137	58	...	...	....	23	30	....	8	16	....	...	....	....	336	470,000	470,000	940,000
2	Fort Adams, Newport, R. I	2,440	59	90	98	21	13	12	83	27	7	3	7	5	7	1	25	458	1,330,060	148,482	1,478,542
3	Fort Trumbull, New London, Conn	350	14	14	14	3	3	3	10	8	...	1	3	1	1		4	79	30,000	243,000	273,000
4	Fort Schuyler, Throg's Neck, N. Y	1,250	48	48	70	8	12	6	70	19	6	2	7	3	5	2	12	318	450,000	290,000	740,000
5	Fort Delaware, Delaware river	750	32	32	54	....	....	....	20	10	....	1	2	....	....	....	....	151	363,800	491,000	854,800
6	Fort Monroe, Old Point Comfort, Va	2,450	42	189	10	14	25	12	16	20	5	3	7	3	5	5	15	371	1,806,917	223,367	2,030,284
7	Fort Calhoun, Hampton roads, Va	1,120	54	54	88	....	....	....	8	20	...	....	....	....	..	....	....	224	1,567,726	416,000	1,983,726
8	Fort Caswell, Oak island, N. C	400	.....	20	32	2	2	....	....	8	....	....	....	....	....	....	....	64	491,179	6,000	497,179
9	Fort Sumter, Charleston, S. C	680	41	41	33	...	9	....	....	12	..	....	....	....	....	....	....	136	226,921	286,000	512,921
10	Fort Pulaski, Cockspur island, Georgia	800	.....	65	53	4	....	....	4	12	2	1	7	..	...	..	2	150	685,308	215,000	900,308
		11,740	354	690	510	52	64	33	234	166	20	19	49	12	18	8	58	2,287	7,421,911	2,788,849	10,210,760
	D.—Works to be first commenced.																				
1	Fort at Bucksport, Penobscot river, Me	500	.....	45	50	4	6	5	9	16	2	....	4	2	2	1	2	148	.....	150,000	150,000
2	Fort at mouth of Kennebec river, Me	500	.....	45	52	4	6	5	9	16	2	....	4	2	2	1	2	150	.....	300,000	§300,000
3	Fort Scammel, House island, Portland, Me	250	.....	17	18	...	....	....	9	2	....	....	....	....	....	....	....	46	.....	48,000	48,000

* Garrison and armament will contribute to those of new fort.
‖ Included in table B.

† Belonging to the State of New York.
§ Not projected; guns, cost, &c, conjectural.

‡ Repairs completed.

No. 1.—*Of the fortifications constructed, constructing, &c.*—Continued.

Classification.	Designation of the works.	Garrison in war.	ARMAMENT.															Expended.	Required to complete.	Total cost of repairs or construction.
			42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Carronades.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total.			
4	Works in Portsmouth harbor, N. H.	750	.....	45	52	4	6	5	9	16	2	....	4	2	2	1	2	150	.....	300,000	*300,000
5	Fort Pickering, Salem, Mass.	300	.....	16	21	2	3	6	11	7	...	1	4	....	....	....	2	73	.....	174,000	174,000
6	Fort on Jack's Point, Marblehead, Mass.	350	.....	32	20	2	2	3	10	7	2	1	4	....	....	....	2	73	.....	174,000	174,000
7	Works at Provincetown, Cape Cod, Mass.	1,000	40	56	56	....	....	....	20	16	...	2	6	2	2	1	4	88	.....	144,000	144,000
8	Works at New Bedford, Mass.	750	.....	45	52	4	6	5	9	16	2	....	4	2	2	....	....	200	.....	600,000	*600,000
9	Fort on Rose island, Naraganset roads, R. I.	470	30	27	21	....	....	....	....	12	....	1	3	....	....	....	....	94	.....	300,000	*300,000
10	Fort on Sollers's Point flats, Md	800	38	76	33	....	....	....	....	12	....	....	....	....	....	....	....	159	.....	150,000	150,000
11	Fort on Thomas's Point, Patuxent river, Md.	350	.....	20	25	2	....	3	6	6	2	1	2	....	....	....	2	69	.....	1,000,000	1,000,000
		6,020	108	424	400	22	29	32	92	126	12	6	35	10	10	5	16	1,327	.....	3,425,000	3,425,000
	Deduct garrison and guns of Nos. 4, 7, 8, and 15, of A.	280	.....	8	23	....	....	9	....	6	....	3	6	....	....	....	....	55	.....	.....	.....
		5,740	108	416	377	22	29	23	92	120	12	3	29	10	10	5	16	1,272	.....	3,425,000	3,425,000
	E.—*Works to be commenced next after those in D.*																				
1	Fort Preble, Portland harbor, Me.	300	8	15	18	4	4	6	10	6	2	....	....	....	....	1	4	78	.....	155,000	†155,000
2	Works at Gloucester, Mass.	500	16	30	33	....	....	....	10	8	....	1	2	....	....	....	....	100	.....	200,000	†200,000
3	Closing Broad Sound Pass, Boston harbor, Mass	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	210,000	†210,000
4	Works at Gurnet Point, Plymouth, Mass.	500	.....	.....	33	4	4	3	....	4	....	....	2	..	....	....	....	50	... .	100,000	†100,000
5	Works at Stonington Point, Conn.	375	.....	20	36	..	....	6	10	....	....	1	2	....	....	....	....	75	.....	200,000	†200,000
6	Fort on Cedar Point, Potomac river, Md.	550	.....	24	50	2	4	6	10	8	....	1	3	....	2	....	....	110	.....	300,000	†300,000
7	Works at Georgetown harbor, S. C.	500	.....	20	44	2	4	6	10	8	2	....	2	....	2	....	....	100	.....	250,000	†250,000
8	Works in Port Royal roads, S. C.	550	.....	24	50	2	4	6	10	8	....	1	3	....	2	....	....	110	.....	300,000	†300,000
9	Works on Tybee island, Savannah river, Ga.	100	.....	16	.....	....	....	3	....	2	....	....	2	....	....	....	....	23	.....	126,000	†120,000
10	Work at Cumberland sound, St. Mary's river, Georgia.	550	.....	20	56	2	4	3	10	8	2	....	3	....	2	....	..	110	.....	200,000	†200,000
		3,925	24	169	320	16	24	39	70	52	6	4	19	..	8	1	4	756	.....	2,035,000	2,035,000

	F.— *Works to be last commenced.*																					
1	Works in Eastport harbor, Maine	250																		$100,000	$$100,000
2	Works in Machias harbor, Maine	250																50		100,000	‡100,000
3	Works on Mount Desert island, Maine	1,000																200		500,000	‡500,000
4	Works at Castine, Maine	125																25		50,000	‡50,000
5	Works at St. George's bay, Maine																				
6	Works at Damariscotta, Maine	1,000																200		400,000	‡400,000
7	Works at Broad bay, Maine																				
8	Works at Sheepscot bay, Maine																				
9	Works in Hog Island channel, Portland, Me.	150																21		135,000	‡135,000
10	Works at the mouth of Saco river, Maine																				
11	Works at the mouth of Kennebunk river, Me.	150																30		75,000	‡75,000
12	Works at York, Maine																	50		100,000	‡100,000
13	Works at Newburyport, Mass	250																25		50,000	‡50,000
14	Works at Beverly, Mass	125																40		51,000	‡51,000
15	Works at Nangus Head, Salem, Mass	180																55		174,000	†174,000
16	Works at Fort Sewall, Marblehead, Mass.	280																			
17	Fort and outworks at Nantasket Head, Boston, Mass.	1,700																334		1,020,000	†1,020,000
18	Redoubt on Hog island, Boston harbor, Mass.																				
19	Works at Nantucket harbor, Mass																				
20	Works at Edgartown, Mass																	125		250,000	‡250,000
21	Works at Falmouth, Mass	625																			
22	Works at Holmes's Hole, Mass.																				
23	Works at Tarpaulin cove, Mass																	403		1,200,000	†1,200,000
24	Works at Canonicut island, R. I	1,800																		307,000	307,000
25	Closing west passage of Narraganset roads, R. I																	82		198,000	†198,000
26	Fort Griswold, New London, Conn	500																			
27	Works at the mouth of Connecticut river, Conn	250																50		100,000	‡100,000
28	Fort Hale, New Haven harbor, Conn	125																25		48,000	‡48,000
29	Fort Wooster, New Haven harbor, Conn	120																12		42,000	†42,000
30	Works for harbors and towns between New Haven and New York	500																100		200,000	‡200,000
31	Works in Gardiner's bay, Long Island sound, N. Y.	750																150		400,000	‡400,000
32	Works in Sag Harbor, N. Y.	250																50		100,000	‡100,000
33	Fort on Wilkins's Point, Long island, N. Y.	1,336																195		686,000	‡686,000
34	Redoubt in advance of Fort Tompkins, Staten island, N. Y.	800																26		52,000	‡52,000
35	Fort on Middle Ground shoal, Sandy Hook, N. Y.	1,760																332		1,681,412	†1,681,412
		1,760																332		1,681,412	†1,681,412
36	Fort on East Bank shoal, Sandy Hook, N. Y.	1,760																225		600,000	‡600,000
37	Fort at Delaware breakwater	1,125																112		521,000	†521,000
38	Fort opposite Fort Delaware, Del.	760																25		50,000	‡50,000
39	Fort on Elk river, Md	169																131		376,000	†376,000
40	Fort on Hawkins's Point, Md	800																100		250,000	‡250,000
41	Works at Annapolis harbor, Md	500																87		246,000	‡246,000
42	Fort on Point Patience, Patuxent river, Md.	400																			

* Not projected; guns, cost, &c., conjectural. † Work projected. ‡ Guns, cost, &c., conjectural. § Guns of Fort Sullivan, No. 1, A.

No. 1.—*Of the fortifications constructed, constructing, &c.*—Continued.

Classification.	Designation of the works.	Garrison in war.	ARMAMENT. 42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Carronades.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total.	Expended.	Required to complete.	Total cost of repairs or construction.
43	Works at St. Mary's, Potomac river, Md	550	.....	.....	.....	....	....	....	...	....	....	...	...	....	..	..	....	110	....	300,000	*300,000
44	Works at Bald Head, Cape Fear river, N. C...	450	.....	....	....	....	....	..	...	..	....	....	....	....	..	..	....	87	.....	180,000	†180,000
45	Works at Federal Point, Cape Fear river, N. C	200	.....	.....	.....	....	....	....	....	....	....	....	....	...	..	....	..	40	.....	18,000	†18,000
46	Works at the mouth of Santee river, S. C....	250	.....	.....	.....	....	....	....	....	....	....	....	....	...	..	....	..	50	.....	100,000	*100,000
47	Works at Bull's bay and other inlets, S. C....																				
48	Works at Stono sound, S. C.....	375	....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	...	75	.....	150,000	*150,000
49	Works at North Edisto sound, S. C																				
50	Works at South Edisto sound, S. C.																				
51	Works at St. Helena sound. S. C	375	.....	.....	.....	....	....	....	....	...	....	....	....	....	....	....	....	75	.....	150,000	*150,000
52	Works at Wassaw sound, Ga.																				
53	Works at Ossabaw sound, Ga																				
54	Works at St. Catharine's sound, Ga																				
55	Works at Sapelo sound, Ga																				
56	Works at Doby inlet, Ga.....	4,000	.....	.....	.....	....	....	....	...	....	....	....	....	....	....	....	....	800	....	1,600,000	*1,600,000
57	Works at Altamaha sound, Ga.....																				
58	Works at St. Simon's sound, Ga.....																				
59	Works at St. Andrew's sound, Ga.....																				
		25,740	574	1,390	1,366	86	109	142	402	401	33	46	145	17	33	12	73	4,829	... .	14,241,824	14,241,824
	Deduct garrison and guns of Nos. 9, 10, and 18, of A.....	195	.....	8	24	....	..	3	....	2	....	....	2	....	....	....	....	39	.....	.....	.....
		25,545	574	1,382	1,342	86	109	139	402	399	33	46	143	17	33	12	73	4,790	.....	14,241,824	14,241,824

RECAPITULATION.

A. Old forts and batteries	5,445	168	268	343	5	14	57	34	114	....	27	64	....	..	....	3	1,097	699,319	1,227,918	1,927,237
B. New fortifications completed	1,870	38	54	99	9	11	14	62	27	...	2	8	..	4	1	7	336	1,601,144	.....	1,601,144
C. Fortifications under construction	11,746	354	690	510	52	64	33	234	166	20	19	49	12	18	8	58	2,287	7,421,911	2,788,849	10,210,760
D. Fortifications to be first commenced	5,740	108	416	377	22	29	23	92	120	12	3	29	10	10	5	16	1,272	.....	3,425,000	3,425,000
E. Fortifications to be next constructed	3,925	24	169	320	16	24	39	70	52	6	4	19	....	8	1	4	756	.....	2,035,000	2,035,000
F. Fortifications to be last commenced	25,545	574	1,382	1,342	86	109	139	402	399	33	46	143	17	33	12	73	4,790	.....	14,241,824	14,241,824
	54,265	1,266	2,979	2,991	190	251	305	894	878	71	101	312	39	73	27	161	10,538	9,722,374	23,718,591	33,440,965

* Guns, cost, &c., conjectural.

† Work projected.

For the board

JOS. G. TOTTEN, *Colonel Engineers.*

WASHINGTON, *April* 23, 1840.

Estimated cost of ordnance of all kinds required for the armament of fortifications, agreeably to statement 1, *embracing cannon mounted, and* 100 *rounds of ammunition for each piece.*

Fortifications.	Ordnance.	CANNON. 42-pound. guns.	32-pound. guns.	24-pound. guns.	18-pound. guns.	12-pound guns.	Field guns.	Carronades.	8 inch sea-coast howitzers.	8-inch siege howitzers.	13-inch mortars.	10-inch heavy mortars.	10-inch light mortars.	8-inch light mortars.	16-inch stone mortars.	Cohorns.	Whole number of cannon.
Old forts and batteries.—Table A.....	Required.....	168	268	343	5	14	57	34	114	.....	27	64	.....	.....	.....	3	1,097
	On hand.....	168	268	343	5	14	57	....	21	.....	.....	19	.....	....	....	.....	895
	To be provided	.....	.....	.....	.....	...	.....	34	93	.....	27	45	....	....	.....	3	202
New fortifications completed.—Table B.	Required	38	54	99	9	11	14	62	27	.....	2	8	.....	4	1	7	336
	On hand.....	13	54	99	9	11	14	.....	....	....	.....	.....	....	4	.....	.....	204
	To be provided.....	25	.....	.....	.....	.....	.....	62	27	.....	2	8	.....	.....	1	7	132
Fortifications under construction.—Table C.	Required	354	690	510	52	64	33	234	166	20	19	49	12	18	8	58	2,287
	On hand.....	.....	690	510	52	42	33	.....	.....	....	.....	.....	12	3	.....	....	1,342
	To be provided.....	354	.....	.....	.....	22	....	234	166	20	19	49	.....	15	8	58	945
Fortifications to be first commenced.—Table D.	Required	108	416	377	22	29	23	92	120	12	3	29	10	10	5	16	1,272
	On hand.....	.....	416	293	22	.....	23	.....	.....	.....	.....	.....	7	.....	.....	.....	761
	To be provided.....	108	.....	84	.....	29	.....	92	120	12	3	29	3	10	5	16	511
Fortifications to be next constructed — Table E.	Required	24	169	320	16	24	39	70	52	6	4	19	.....	8	1	4	756
	On hand.....	.....	8	.....	16	.....	39	.....	.....	.....	.....	.....	.....	.....	.....	.....	63
	To be provided.....	24	161	320	.....	24	.....	70	.....	6	4	19	....	8	1	4	693
	Required from A to E....	692	1,597	1,649	104	142	166	492	479	38	55	169	22	40	15	88	5,748
Fortifications to be last constructed.—Table F.	Required	574	1,382	1,342	86	109	139	402	399	33	46	143	17	33	12	73	4,790
	On hand.....	.....	.....	.....	86	.....	139	.....	.....	.....	.....	.....	.....	.....	.....	.....	225
	To be provided.....	574	1,382	1,342	.....	109	.....	402	399	33	46	143	17	33	12	73	4,565
	Grand total required.....	1,266	2,979	2,991	190	251	305	894	878	71	101	312	39	73	27	161	10,538
	Grand total on hand.....	181	1,436	1,245	190	67	305	....	21	.....	.....	19	19	7	.....	.....	3,490
	Grand total to be provided	1,085	1,543	1,746	.....	184	.....	891	857	71	101	293	20	66	27	161	7,048

Estimated cost of ordnance of all kinds required for the armament of fortifications, &c.—Continued.

Fortifications.	Ordnance.	CARRIAGES FOR—														
		42-pound. guns.	32-pound. guns	24-pound guns.	18-pound. guns.	12-pound. guns.	Field guns.	Carronades.	8 inch sea-coast howitzers.	8-inch siege howitzers.	13 inch mortars.	10-inch heavy mortars.	10-inch light mortars.	8-inch light mortars.	Stone mortars.	Cohorns.
Old forts and batteries.—Table A.....	Required	168	268	343	5	14	57	34	114	.....	27	64	.....	.....	.....	3
	On hand.....	50	268	343	....	.....	57	.....	.....	.....	....	.....	.....	.....	.....	.....
	To be provided.....	118	.....	.....	5	14	.....	34	114	.....	27	64	.....	....	....	3
New fortifications completed.—Table B.. ...	Required	38	54	99	9	11	14	62	27	.....	2	8	.....	4	1	7
	On hand.....	.....	54	99	.....	.....	14	.....	.....	.....	....	.....	.....	....	....	.....
	To be provided.....	38	.....	.....	9	11	.....	62	27	.....	2	8	.....	4	1	7
Fortifications under construction.—Table C..	Required	354	690	510	52	64	33	234	166	20	19	49	12	18	8	58
	On hand.....	.....	224	33	....	.....	33	.....	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided.....	354	466	477	52	64	.....	234	166	20	19	49	12	18	8	58
Fortifications to be first commenced.—Table D	Required	108	416	377	22	29	23	92	120	12	3	29	10	10	5	16
	On hand...	.....	.....	.....	.....	....	23	.....	.....	.....	.....	.....	.....	.....	.....	... ..
	To be provided.....	108	416	377	22	29	.....	92	120	12	3	29	10	10	5	16
Fortifications to be next constructed —Table E.	Required	24	169	320	16	24	39	70	52	6	4	19	. ....	8	1	4
	On hand	.....	.....	.....	....	.....	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided.....	24	169	320	16	24	.....	70	52	6	4	19	.....	8	1	4
	Required from A to E....	692	1,597	1,649	104	142	166	492	479	38	55	169	22	40	15	88
Fortifications to be last constructed.—Table F.	Required	574	1,382	1,342	86	109	139	402	399	33	46	143	17	33	12	73
	On hand.....	.....	.....	.....	....	....	139	.....	.....	.....	.....	.....	....	.....	.....	.....
	To be provided.....	574	1,382	1,342	86	109	.....	402	399	33	46	143	17	33	12	73
	Grand total required.	1,266	2,979	2,891	190	251	305	894	878	71	101	312	39	73	27	161
	Grand total on hand..... ...	50	546	475	....	.....	305	....	.. ...	.....	...	.....	.....	.....	.....	.....
	Grand total to be provided....	1,216	2,433	2,516	190	251	.....	894	878	71	101	312	39	73	27	161

Estimated cost of ordnance of all kinds required for the armament of fortifications, &c.—Continued.

Fortifications.	Ordnance.	PROJECTILES.										CANNON POWDER.
		42-pound. shot.	32-pound. shot.	24-pound. shot.	18-pound. shot	12-pound. shot.	Shot for field-guns.	24 pound. shells.	8-inch shells.	13-inch shells.	10-inch shells.	Charges for stone mortars.	Pounds.
Old forts and batteries.—Table A..	Required	16,800	26,800	34,300	500	1,400	5,700	3,700	11,400	2,700	6,400	.....	878,800
	On hand	13,835	26,800	34,300	500	1,400	5,700	3,700	6,120	.....	6,400	.....	878,800
	To be provided	2,965	.....	.....	.....	.....	.....	.....	5,280	2,700	.....	.....	.....
New fortifications completed.—Table B.	Required	3,800	5,400	9,900	900	1,100	1,400	6,900	3,100	200	800	100	205,800
	On hand	.....	5,400	9,900	900	1,100	1,400	5,348	.....	.....	800	.....	60,170
	To be provided	3,800	.....	.....	.....	.....	.....	1,552	3,100	200	.....	100	144,630
Fortifications under construction.—Table C.	Required	35,400	69,000	51,000	5,200	6,400	3,300	29,200	20,400	1,900	6,100	800	1,616,300
	On hand	.....	69,000	32,000	5,200	6,400	3,300	.....	.....	.....	6,100	.....	.....
	To be provided	35,400	.....	19,000	.....	.....	.....	29,200	20,400	1,900	.....	800	1,616,300
Fortifications to be first commenced —Table D.	Required	10,800	41,600	37,700	2,200	2,900	2,300	10,800	14,200	300	3,900	500	874,300
	On hand	.....	11,020	.....	2,200	2,900	2,300	.....	.....	.....	3,900	.....	.....
	To be provided	10,800	30,580	37,700	.....	.....	.....	10,800	14,200	300	.....	500	874,300
Fortifications to be next constructed —Table E.	Required	2,400	16,900	32,000	1,600	2,400	3,900	7,400	6,600	400	1,900	100	471,300
	On hand	.....	.....	.....	1,600	2,400	3,900	.....	.....	.....	54	.....	.....
	To be provided	2,400	16,900	32,000	.....	.....	.....	7,400	6,600	400	1,846	100	481,300
	Required from A to E	69,200	159,700	164,900	10,400	14,200	16,600	58,000	55,700	5,500	19,100	1,500	4,046,500
Fortifications to be last constructed —Table F.	Required	57,400	138,200	134,200	8,600	10,900	13,900	47,500	46,500	4,600	16,000	1,200	3,388,750
	On hand	.....	.....	.....	8,600	10,900	13,900	.....	.....	.....	.....	.....	.....
	To be provided	57,400	138,200	134,200	.....	.....	.....	47,500	46,500	4,600	16,000	1,200	3,388,750
	Grand total required	126,600	297,900	299,100	19,000	25,100	30,500	105,500	102,200	10,100	35,100	2,700	7,435,250
	Grand total on hand	13,835	112,220	76,200	19,000	25,100	30,500	9,048	6,120	.....	17,254	.....	938,970
	Grand total to be provided	112,765	185,680	222,900	.....	.....	.....	96,452	96,080	10,100	17,846	2,700	6,496,280

Estimated cost of ordnance of all kinds required for the armament of fortifications, &c.—Continued.

Fortifications.	Ordnance.	COST OF ARMAMENT.				
		Cannon.	Carriages.	Projectiles.	Powder.	Total amount.
Old forts and batteries.—Table A.	Required	$403,935 00	$361,935 00	$203,340 00	$175,760 00	$1,144,970 00
	On hand	338,115 00	242,375 00	151,782 40	175,760 00	908,032 40
	To be provided	65,820 00	119,560 00	51,557 60		236,937 60
New fortifications completed.—Table B.	Required	105,065 00	105,455 00	47,283 00	41,160 00	298,963 00
	On hand	69,105 00	55,275 00	28,454 00	12,034 00	164,869 00
	To be provided	35,960 00	50,180 00	18,829 00	29,126 00	134,095 00
Fortifications under construction.—Table C.	Required	816,770 00	739,590 00	351,484 00	323,260 00	2,231,104 00
	On hand	502,360 00	99,025 00	164,284 00		765,669 00
	To be provided	314,410 00	640,565 00	187,200 00	323,260 00	1,465,435 00
Fortifications to be first commenced.—Table D.	Required	451,405 00	411,685 00	188,547 00	174,860 00	1,226,497 00
	On hand	290,925 00	6,900 00	39,560 40		337,385 40
	To be provided	60,480 00	404,785 00	148,986 60	174,860 00	889,111 60
Fortifications to be next constructed.—Table E.	Required	243,410 00	240,329 00	102,333 00	94,260 00	680,323 00
	On hand	11,500 00	11,700 00	4,203 60		27,403 60
	To be provided	231,910 00	228,620 00	98,129 40	94,260 00	652,919 40
	Required from A to E.	2,020,585 00	1,858,985 00	892,987 00	809,300 00	5,581,857 00
Fortifications to be last construced.—Table F.	Required	1,692,110 00	1,551,500 00	746,770 00	677,750 00	4,668,130 00
	On hand	35,400 00	41,700 00	17,202 00		94,302 00
	To be provided	1,656,710 00	1,509,800 00	729,568 00	677,750 00	4,573,828 00
	Grand total req'red	3,712,695 00	3,410,475 00	1,639,757 00	1,487,050 00	10,249,987 00
	Grand total on hand	1,247,405 00	456,975 00	405,486 40	187,794 00	2,297,660 40
	Grand total to be provided.	2,465,290 00	2,953,510 00	1,234,270 60	1,299,256 00	7,952,326 60

NOTE.—The cost of saltpetre and brimstone may be estimated at one-half of the cost of gunpowder.

ORDNANCE OFFICE, *Washington, January* 16, 1840.

No. 2.—*Of the fortifications constructed, constructing, or repairing, and of those proposed to be constructed or repaired for the defence of the Gulf frontier, from Cape Florida to the Sabine bay.*

Classification.	Designation of the works.	Garrison in war.	ARMAMENT.															Expended.	Required to complete.	Total cost of repairs or construction.
			42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field-pieces.	Carronades.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total.			
	A.—*Old works repaired and those proposed to be repaired, with the amounts expended, and the amounts required to put them in a serviceable condition.*																			
1	Fort Barrancas, Pensacola, Fla	250	.....	11	10	5	3	3	8	4	....	....	2	...	1	...	2	49	$75,000	$100,000	$175,000
2	Fort St. Philip, Mississippi, La	100	.....	.....	16	....	....	..	....	4	....	....	....	....	....	....	....	20	....	3,300	3,300
3	Fort Pickens, Pensacola harbor, Fla	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	8,000	*8,000
4	Fort Morgan, Mobile Point, Ala	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	10,000	*10,000
5	Fort Pike, Rigolets, La.	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	5,000	*5,000
6	Fort Wood, Chef Menteur, La	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	3,580	*3,580
7	Battery Bienvenue, La	.....	.....	.....	.....	....	....	..	....	....	....	....	....	....	....	....	....	.....	.....	2,500	*2,500
8	Tower at Bayou Dupré, La	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	400	*100
9	Fort Jackson, Mississippi river, La	.....	.....	.....	.....	...	....	....	....	....	....	....	....	....	....	....	....	.....	.....	20,000	*20,000
		350	.....	11	26	5	3	3	8	8	....	....	2	....	1	....	2	69	75,000	152,780	227,780
	B.—*New works completed.*																			
1	Fort Pickens, Pensacola, Fla	1,260	63	17	49	5	13	6	26	13	....	1	4	4	4	2	5	212	677,000	.....	677,000
2	Fort Morgan, Mobile Point, Ala	700	14	.....	52	3	4	6	26	10	....	2	4	2	2	2	5	132	1,026,777	....	1,026,777
3	Fort Pike, Rigolets, La	300	....	.....	28	..	6	...	9	5	....	....	1	..	...	...	....	49	314,597	.....	314,597
4	Fort Wood, Chef Menteur, La	300	... ..	.....	28	3	6	..	9	5	....	....	1	....	...	...	....	52	378,642	.....	378,642
5	Battery Bienvenue, La	100	.....	.....	8	....	3	....	...	2	....	....	....	....	....	....	....	13	96,447	.....	96,447
6	Tower at Bayou Dupré, La	50	.....	.....	4	....	....	....	....	2	....	....	1	....	....	....	....	7	16,677	.....	16,677
7	Fort Jackson, Mississippi river, La	350	.....	.....	42	....	7	....	10	5	....	1	2	....	....	....	....	67	638,766	.....	638,766
		3,060	77	17	211	11	39	12	80	42	....	4	13	6	6	4	10	532	3,148,906	.....	3,148,906

	C.—Works under construction.																			
1	Fort on Foster's bank, Pensacola, Fla.....	650	24	24	66	....	....	3	..	10	....	....	2	....	....	....	....	129	302,648	14,000	316,648
2	Fort Livingston, Barrataria island, La	300	.....	.....	28	....	6	3	9	5	....	....	1	....	....	....	.. .	52	75,000	325,000	400,000
		950	24	24	94	...	6	6	9	15	....	....	3	....	..	....	..	181	377,648	339,000	716,648
	E.—Works to be constructed after those in D of statement 1 are completed.																			
1	Tower at Pass-au-Heron, Mobile bay, Ala.....	60	.....	.....	6	2	2	....	....	2	....	....	....	....	....	....	....	12	.....	25,000	†25,000
	F.—Works to be last commenced.																			
1	Works at Key West or Tortugas, Fla.....	2,500	.....	.....	.....	....	....	....	...	....	....	....	....	....	....	....	....	500	.....	3,000,000	‡3,000,000
2	Works at Charlotte harbor, Fla																			
3	Works at Espiritu Santo bay, Fla.....																			
4	Works at Appalachicola bay, Fla.....	1,250	.....	.....	.....	....	....	....	....	. ..	....	....	....	....	....	....	....	250	.....	1,000,000	‡1,000,000
5	Works at Appalachie, Fla.....																			
6	Works at St. Joseph's bay, Fla																			
7	Works at Santa Rosa bay, Fla.....																			
8	Works to cover navy yard at Pensacola, Fla...	100	.....	.....	.....	...	....	....	....	....	....	....	....	....	....	....	....	.....	.....	200,000	‡200,000
9	Works at Perdido bay, Ala.....	400	.....	.....	.....	....	....	....	....	....	....	....	....	....	...	....	....	50	.....	200,000	‡200,000
10	Fort at Dauphin island, Mobile bay, Ala.....	900	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	128	.....	880,000	‡880,000
		5,150	118	61	394	21	58	25	113	78	....	5	21	7	8	5	14	928	.....	5,280,000	5,280,000

RECAPITULATION.

A.	Old forts and batteries..	350	.....	11	26	5	3	3	8	8	...	...	2	....	1	...	2	69	75,000	152,780	227,780
B.	New fortifications completed	3,060	77	17	211	11	39	12	80	42	...	4	13	6	6	4	10	532	3,148,906	... .	3,148,006
C.	Fortifications under construction.....	950	24	24	94	....	6	6	9	15	....	....	3	....	....	....	....	181	377,648	339,000	716,648
E.	Works to be constructed after those in D, of statement 1, are completed.....	60	... .	.....	6	2	2	....	....	2	....	....	....	....	....	....	....	12	.....	25,000	25,000
F.	Works to be last commenced.....	5,150	118	61	394	21	58	25	113	78	....	5	21	7	8	5	14	928	.....	5,280,000	5,280,000
		9,570	219	113	731	39	108	46	210	145	....	9	39	13	15	9	26	1,722	3,601,554	5,796,780	9,398,334

* Included in B.

† Work projected.

‡ Guns, cost, &c., conjectural.

For the board.

JOS. G. TOTTEN, *Colonel Engineers.*

WASHINGTON, *April* 23, 1840.

Estimated cost of ordnance of all kinds required for the armament of fortifications, agreeably to statement 2, embracing cannon mounted, and 100 rounds of ammunition for each piece.

Fortifications.	Ordnance.	CANNON.													
		42-pounder guns.	32-pounder guns.	24-pounder guns.	18-pounder guns.	12-pounder guns.	Field guns.	Carronades.	8-inch sea-coast howitzers.	8-inch siege howitzers.	13-inch mortars.	10-inch heavy mortars.	10-inch light mortars.	8-inch light mortars.	16-inch stone mortars.
Old forts and batteries.—Table A	Required	.....	11	26	5	3	3	8	8	.....	.....	2	.....	1	.....
	On hand	.....	11	26	5	3	3	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided	....	.....	.....	.....	.....	.....	8	8	.....	.....	2	.....	1	.....
New fortifications completed.—Table B	Required	77	17	211	11	39	12	80	42	.....	4	13	6	6	4
	On hand	28	17	211	11	39	12	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided	49	.....	.....	.....	.....	.....	80	42	.....	4	13	6	6	4
Fortifications under construction.—Table C	Required	24	24	94	.....	6	6	9	15	.....	.....	3	.....	.....	.....
	On hand	.....	24	94	.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided	24	.....	.....	.....	.....	.....	9	15	.....	.....	3	.....	.....	.....
Works to be constructed after those in table D, statement 1, are completed.—Table E.	Required	.....	.....	6	2	2	.....	.....	2	.....	.....	.....	.....	.....	.....
	On hand	.....	.....	....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided	.....	.....	6	.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....
	Required from A to E	101	52	337	18	50	21	97	67	.....	4	18	6	7	4
Works to be last commenced.—Table F	Required	118	61	394	21	58	25	113	78	.....	5	21	7	8	5
	On hand	.....	.....	.....	21	.....	25	.....	.....	.....	.....	.....	.....	.....	.....
	To be provided	118	61	394	.....	58	....	113	78	.....	5	21	7	8	5
	Grand total required	219	113	731	39	108	46	210	145	.....	9	39	13	15	9
	Grand total on hand	28	52	331	39	48	46	.....	.....	.....	.....	.....	.....	.....	.....
	Grand total to be provided	191	61	400	.....	60	.....	210	145	.....	9	39	13	15	9

Estimated cost of ordnance of all kinds required for the armament of fortifications, &c.—Continued.

Fortifications.	Ordnance.	CANNON.		CARRIAGES FOR—											
		Cohorns.	Whole number of cannon.	42-pounder guns.	32-pounder guns.	24-pounder guns.	18-pounder guns.	12-pounder guns.	Field guns.	Carronades.	8-inch sea-coast howitzers.	8-inch siege howitzers.	13-inch mortars.	10-inch heavy mortars.	10-inch light mortars.
Old forts and batteries.—Table A	Required	2	69	.....	11	26	5	3	3	8	8	.....	.....	2	.....
	On hand	.....	48	.....	11	26	.....	.....	3	.....	.....	.....	...	....	.....
	To be provided	2	21	...	.....	.....	5	3	.....	8	8	.....	.....	2	.....
New fortifications completed.—Table B	Required	10	532	77	17	211	11	39	12	80	42	.. ...	4	13	6
	On hand	.....	318	.....	17	211	....	.....	12	.....	.....	.....	.....	....	.....
	To be provided	10	214	77	.....	.....	11	39	.....	80	42	.....	4	13	6
Fortifications under construction.—Table C	Required	.....	181	24	24	94	.....	6	6	9	15	.....	.....	3	.....
	On hand	....	130	.....	7	6	.....	.....	6	.....	....	....	.....	.....	.....
	To be provided	.....	51	24	17	88	.....	6	.....	9	15	....	.....	3	.....
Works to be constructed after those in table D, statement 1, are completed.—Table E.	Required	.....	12	.....	.....	6	2	2	.....	.....	2	.....	.....	.....	.....
	On hand	.....	2	.....	....	....	....	.....	....	.....	....	....	.....	.....	.....
	To be provided	.. ...	10	.....	.....	6	2	2	.....	.....	2	.....	.....	.....	.....
Required from A to E		12	794	101	52	337	18	50	21	97	67	.....	4	18	6
Works to be last commenced.—Table F	Required	14	928	118	61	394	21	58	25	113	78	.....	5	21	7
	On hand	.....	46	.....	.....	....	.....	.....	25	.....	.....	....	.....	....	.....
	To be provided	14	882	118	61	394	21	58	.....	113	78	.....	5	21	7
	Grand total required	26	1,722	219	113	731	39	108	46	210	145	.....	9	39	13
	Grand total on hand	.....	544	.....	35	243	.....	.....	46	....	.....	.....	.....	.....	.....
	Grand total to be provided	26	1,178	219	78	488	39	108	....	210	145	.....	9	39	13

Estimated cost of ordnance of all kinds required for the armament of fortifications, &c.—Continued.

Fortifications.	Ordnance.	CARRIAGES FOR—			PROJECTILES.								
		8-inch light mortars	Stone mortars.	Cohorns.	42-pounder shot.	32-pounder shot.	24-pounder shot.	18-pounder shot.	12-pounder shot.	Shot for field guns.	24-pounder shells.	8-inch shells.	13-inch shells.
Old forts and batteries.—Table A	Required	1	.....	2	.....	1,100	2,600	500	300	300	1,000	900	.....
	On hand	.....	.....	....	.....	1,100	2,600	500	300	300	1,000	.....	.....
	To be provided	1	.....	2	.....	.....	.....	.....	.....	.....	.....	900	.....
New fortifications completed.—Table B	Required	6	4	10	7,700	1,700	21,100	1,100	3,900	1,200	9,000	4,800	400
	On hand	.....	.....	.....	.....	1,700	21,000	1,100	3,900	1,200	6,800	.....	.....
	To be provided	6	4	10	7,700	.....	.....	.....	.....	.....	.....	2,200	4,800	400
Fortifications under construction.—Table C	Required	.....	.....	.....	2,400	2,400	9,400	.....	600	600	900	1,500	.....
	On hand	.....	.....	.....	.....	2,400	5,915	.....	600	600	.....	.....	.....
	To be provided	.....	.....	.....	2,400	.....	3,485	.....	.....	.....	900	1,500	.....
Works to be constructed after those in table D, statement 1, are completed.—Table E.	Required	.....	.....	.....	.....	.....	600	200	200	.....	.....	200	.....
	On hand	.....	.....	.....	.....	.....	.....	200	200	.....	.....	.....	.....
	To be provided	.....	.....	.....	.....	.....	600	.....	.....	.....	.....	200	.....
	Required from A to E	7	4	12	10,100	5,200	33,700	1,800	5,000	2,100	10,900	7,400	400
Works to be last commenced.—Table F	Required	8	5	14	11,800	6,100	39,400	2,100	5,800	2,500	12,700	8,600	500
	On hand	.....	.....	.....	.....	.....	.....	2,100	5,800	2,500	.....	.....	.....
	To be provided	8	5	14	11,800	6,100	39,400	.....	.....	.....	12,700	8,600	500
	Grand total required	15	9	26	21,900	11,300	73,100	3,900	10,800	4,600	23,600	16,000	900
	Grand total on hand	.....	.....	.....	.....	5,200	29,615	3,900	10,800	4,600	7,800	.....	.....
	Grand total to be provided	15	9	26	21,900	6,100	43,485	.....	.....	.....	15,800	16,000	900

Estimated cost of ordnance of all kinds required for the armament of fortifications, &c.—Continued.

Fortifications.	Ordnance.	PROJECTILES.		CANNON POWDER.	COST OF ARMAMENT.				
		10-inch shells.	Charges for stone mortars.	Pounds.	Cannon.	Carriages.	Projectiles.	Powder.	Total amount.
Old forts and batteries.—Table A	Required	200	.....	38,950	$20,320 00	$20,660 00	$9,138 00	$7,790 00	$57,908 00
	On hand	200	.....	38,950	15,550 00	13,200 00	6,762 00	7,790 00	43,302 00
	To be provided	.....	.....	.....	4,770 00	7,460 00	2,376 00	.....	14,606 00
New fortifications completed.—Table B	Required	1,900	400	327,450	164,075 00	164,745 00	76,870 00	65,490 00	471,180 00
	On hand	1,900	.....	95,735	101,975 00	78,125 00	43,626 00	19,147 00	242,873 00
	To be provided	.....	400	231,715	62,100 00	86,620 00	33,244 00	46,343 00	228,307 00
Fortifications under construction.—Table C	Required	300	.....	122,400	62,530 00	59,950 00	23,812 00	24,480 00	170,772 00
	On hand	300	.....	.....	43,150 00	6,200 00	11,243 00	.....	60,593 00
	To be provided	.....	.....	122,400	19,380 00	53,750 00	12.569 00	24,480 00	110,179 00
Works to be constructed after those in table D, statement 1, are completed.—Table E.	Required	.....	.....	6,700	3,550 00	3,590 00	1,372 00	1,340 00	9,852 00
	On hand	.....	.....	.....	500 00	.....	244 00	.....	744 00
	To be provided	.....	.....	6,700	3,050 00	3,590 00	1,128 00	1,340 00	9,108 00
	Required from A to E	2,400	400	495,500	250,475 00	248,945 00	111,192 00	99,100 00	709,712 00
Works to be last commenced.—Table F.	Required	2,800	500	579,850	293,080 00	290,990 00	130,181 00	115,970 00	830,221 00
	On hand	.....	.....	.....	7,750 00	7,500 00	5,412 00	.....	20,652 00
	To be provided	2,800	500	579,850	285,330 00	283,490 00	124,769 00	115,970 00	809,559 00
	Grand total required	5,200	900	1,075,350	543,555 00	539,935 00	241,373 00	215,070 00	1,539,933 00
	Grand total on hand	2,400	.....	134,685	168,925 00	105,025 00	67,287 00	26,937 00	368,174 00
	Grand total to be provided	2,800	900	940,665	374,630 00	434,910 00	174,086 00	183,133 00	1,171,759 00

NOTE.—The cost of saltpetre and brimstone may be estimated at one-half of the cost of gunpowder.

ORDNANCE OFFICE, *Washington, January* 16, 1840.

REPORT ON THE NORTHERN FRONTIER.

This frontier extends, as described by the terms of the resolution, from Lake Superior to Passamaquoddy bay, a distance of somewhat more than two thousand miles, binding all the way on the British American Provinces.

Whether we regard the strongly marked geographical features of this frontier, presenting, as it does, for the most part, a chain of great lakes or inland seas, stretching along the border, the common property of both nations, and affording facilities for an extensive commerce, almost rivalling that of the ocean itself; or whether we look to the growing strength of our colonial neighbors, fostered by the immense power and resources of the mother country; its vast importance cannot fail to impress us with the necessity of being prepared, not only for defence along that line, but also to act offensively, with decisive effect, in the event of our being involved in a conflict.

From the peculiar character of this frontier, its defence must necessarily partake somewhat of the system applicable to the seacoast; for, although it is denominated inland, in contradistinction to the latter, it is, nevertheless, maritime in many of its features, and must be treated accordingly for purposes of defence.

So important is the mastery on the lakes, in any military operations in that quarter, that it is scarcely to be doubted that, in the event of war, there will be some naval preparations on both sides, and a struggle for the ascendancy on those waters. Whichever power shall acquire that, even temporarily, will have the means of assailing his adversary with great effect along the shores of the lakes, in the absence of fortifications, by occupying the harbors, destroying the towns, (some of which are fast advancing to the rank of cities,) and controlling the commercial operations of which those lakes constitute the principal channel. These considerations render it highly expedient—indeed, necessary—to fortify the larger harbors on the lakes, as well as the more important passes on the straits and rivers by which they are connected.

Without entering fully into the military details of the subject, which might be deemed somewhat out of place here, regarding the object of the resolution, which seems to look rather to the expense involved, the board will proceed to enumerate the works of defence deemed necessary on the northern frontier, beginning at Lake Superior; merely glancing at the effects and advantages which are likely to result from the establishment of those works.

1. *Fort at Falls of St. Mary.*—A fort here will control the communication between Lake Huron and Lake Superior, and, at least, prevent an enemy from availing itself of it for purposes of communication and for the transportation of supplies, if it does not secure those important advantages to us; which it would do, unless counteracted by a work on the British side of the line. In that event, almost certain to occur, it would be neutralized, but would still serve to cover and protect our settlements along the St. Mary, and form a rallying point for local defence in times of alarm.

Estimated expense of fort, barracks, &c. $75,000

2. *Fort at Michilimackinac.*—Although this position is somewhat interior, it is regarded of high importance from its geographical relations. A fort here, in conjunction with floating batteries, may be made to command, effectually, the approach to Lake Michigan, and shut out an enemy who might possess a naval ascendancy on Lake Huron; thus protecting the entire circumference of Lake Michigan from attacks to which it would otherwise be exposed, even from a small force, and securing it to ourselves as a safe channel of communication with the rich and productive States in the rear, whose shores it washes.

Estimated expense 50,000

3. *Fort at the foot of Lake Huron.*—A work here will control the outlet of Lake Huron, and interrupt the navigation between that and Lake St. Clair and the river Detroit. It will serve also to cover the settlements on that part of the frontier, and form a rallying point for the neighboring militia for local defence.

Estimated expense..... $50,000

4. *Fort and barrack establishment at Detroit.*—In the event of war, Detroit would undoubtedly be a point of considerable concentration of troops, not merely for the defence of that portion of the frontier, but for such offensive operations as might be deemed expedient in that quarter. It may be regarded as the centre of the upper section of the northern frontier, and has important relations, both geographical and military. Although true policy would, in such a case, dictate that our chief efforts should be directed against the vital points of the enemy's possessions as low down the line as practicable, still it might become expedient, with a view to distract his attention and divide his forces, to menace him above; and this is one of the points from which he might be assailed by minor expeditions, especially if he should relax his measures of defence in looking to his safety elsewhere.

Estimated expense of barracks for one regiment, including site.....	$150,000	
Estimated expense of fort at Spring Wells, including site.....	100,000	
		250,000

5. *Field-work and barrack establishment at or near Buffalo.*—The wealth and commercial importance of Buffalo, and its close proximity to the British line, will make it an object of attack in time of war, unless it be protected by the presence of a respectable force there. It may also become a point of concentration of troops for minor offensive movements, by way of diversion; and is thus, in every view, entitled to seasonable attention. An extensive barrack establishment, defended by field-works, would be sufficient for all necessary objects.

Estimated expense..... 150,000

6. *Fort Niagara to be rebuilt.*—A fort at this position is important, on the assumption (admitting, it is believed, of but little doubt) that in time of war there would be some naval preparations on Lake Ontario. It commands the entrance into the Niagara river; and a work here will shut the enemy's vessels out from that harbor, while it will afford protection under which ours may take shelter in case of need.

Estimated expense of completing the work now in progress.....	$27,500	
For repairs of buildings and new barracks there....	37,500	
		65,000

7. *Fort at Oswego.*—The growing importance of Oswego, the relation it bears to the great line of internal communication to the west, and its exposed situation, directly on the shore of the lake, from whence it might be assailed by armed vessels without the co-operation of a land attack, call for works of defence to protect the harbor, and thus secure a safe retreat for our vessels in case of need, while we shut out those of the enemy. Besides, this

place possesses many advantages for naval preparations for vessels of light draught of water, and would probably be made a subordinate depot in time of war.

Estimated expense of completing the works now in progress..... $20,000
For barracks, quarters, storehouses, and magazine.. 25,000 $45,000

8. *Fort at Sackett's Harbor.*—In the event of naval armaments of any considerable extent being resorted to on Lake Ontario, Sackett's Harbor, from its bold water, and its excellency as a harbor, would at once become a depot of great importance; the safety of which should be insured against the enterprises of the enemy by the timely construction of appropriate works of defence. Situated directly opposite to the strong post of Kingston, on the Canadian side, and adjacent to the head of the St. Lawrence, it is one of the points at which a concentration of troops may become expedient for the defence of that portion of the frontier and the protection of the naval depot. The barrack accommodations already established there are deemed sufficient, and it remains to fortify the approach to the harbor.

Estimated expense of fort and barracks within..... 75,000

9. *Fort at the narrows of the St. Lawrence, below Ogdensburg.*—The chief object of a work here would be to cut off the enemy's communication, by the river, between Montreal and Kingston, and thus prevent him from availing himself of that channel for the transportation of troops and supplies if we cannot entirely secure it to ourselves. By this obstruction on the St. Lawrence he would be thrown altogether upon his back line of communication by the Ottawa, which, although it has the merit of being more secure from interruption, is longer and more difficult, especially in seasons of drought. This would also be another point from which the enemy might be menanced, and from which auxiliary movements might be made in aid of the chief attack.

Estimated expense of fort and barracks..... 100,000

10. *Fort near the line on Lake Champlain.*—A work here may be made to command the pass of the lake, and is considered by far the most important of any proposed on the whole line of frontier.

The position of Lake Champlain is somewhat peculiar. While Ontario, Erie, Huron, and Superior stretch their whole length directly along the border, (forming, in fact, the boundary,) Champlain extends deeply into our territory, at right angles with the line of the frontier; and, while its southern extremity reaches almost to the Hudson, it finds its outlet, to the north, in the St. Lawrence, nearly midway between Montreal and Quebec, the two great objects of attack.

This is undoubtedly the avenue by which the British possessions may be most effectually assailed; while, at the same time, it would afford to the enemy possessing a naval ascendancy equal facilities for bringing the war within our own borders if it be left unfortified. It therefore becomes important to fortify a point as near the line as practicable, so as to shut out the enemy's vessels, and thus effect the double object of protecting the interior shores

of the lake from the predatory attacks to which they would otherwise be exposed, and of securing it to ourselves as the great channel by which our troops and supplies may be rapidly thrown forward to the points of attack or defence.

For a permanent work on Stony Point, (N. Y.,) including purchase of site	$300,000	
For a permanent work on Windmill Point, (Vt.,) including purchase of site	300,000	
		$600,000

11. *Barrack establishment and depot at Plattsburg.*—In the event of war, Plattsburg will become the great depot for the operations on the Champlain frontier, the point of concentration of troops preparatory to any offensive movements, and the station of the reserve to sustain those movements, and the posts that may be established in advance. Even in time of peace a respectable force should be posted here, especially during the continuance of the boundary question and border disturbances. Barracks for a regiment, at least, with suitable storehouses, are recommended to be erected, on a plan admitting of extension, if required, and also of suitable defensive arrangements.

Estimated expense of completing the works in progress on the scale here suggested	150,000

12. From Lake Champlain, eastward, the geographical features of the frontier materially change character, and require a corresponding modification of the means of defence. The line no longer intersects great lakes, admitting of naval preparations, nor binds on straits and rivers, the navigation of which may be controlled or interrupted by fortifications. It is altogether *inland* until it reaches the St. Croix, where the principles that have been applied to other portions of the frontier similarly situated will again become applicable. Running on a parallel of latitude to the Connecticut river, and thence along a chain of highlands, not yet clearly defined, to the Province of New Brunswick, the board are not aware that there are any points immediately on the frontier sufficiently commanding, of themselves, to call for the establishment and maintenance of fortifications or works of defence.

Should it ever become necessary to sustain by force our title to the territory now in dispute, it must be done, not by isolated forts along the frontier, commanding, probably, nothing beyond the range of their own guns, but by an active army, competent not only to occupy the country and hold it, but also to assume the offensive, if necessary, and carry the war beyond our borders.

But while it is not deemed expedient to construct a chain of forts along this portion of the frontier, the board consider it a proper measure of precaution, in the present state of our relations with the British provinces, that positions should be selected and preparatory arrangements made for the establishment of depots of supplies at the head of navigation on the Kennebunk and Penobscot. In the event of movements in that quarter, these would be proper points for the concentration of troops, and would serve as a base of operations, whether these should be offensive or defensive in their character.

Estimated expense of storehouses and other accommodations	150,000

13. *Fort at Calais, on the St. Croix river.*—A work here, while it will serve to cover that part of the State of Maine from the attacks to which it would otherwise be exposed, may, from its advanced position, be made to act an important though indirect part in the defence of the more northern portion of the frontier. Calais appears to be a very eligible point for the concentration of troops with reference to existing circumstances. A strong force stationed here, threatening the enemy's posts on the lower St. John's, and held ready to strike in that direction in case of movements from New Brunswick towards the disputed territory, could not fail to have a decisive influence on such movements; since it is obvious that they could not be made with safety while exposed to attack in flank and rear, and to have their line of communication intercepted and their depots seized, by a prompt movement on our part from the St. Croix.

Estimated expense of fort and barracks..... $100,000

14. In reference to the northern frontier generally, it is the decided opinion of the board that, besides the defences which have been suggested along the border, chiefly for purposes of local protection, there should be a great central station at some position in the interior at which troops might be assembled for instruction, and where they would still be within supporting distance of the more exposed parts of the frontier.

Turning our views inland in search of some single position at which preparations might be made for extended operations on this frontier, and from which aid and succor could always be speedily derived, some position which, while it shall be equally near to many important points of the enemy's possessions, shall afford at no time any indication of the direction in which our efforts are to be made; which will, if it be possible, unite the opposite qualities of being at the same time remote and proximate far as to distance, but near as to time; which, while it brings a portion of the military resources of the country to the support of the inland frontier, and places them in the best attitude for operations in that quarter, whether defensive or offensive, at the same time takes them not away from the sea-coast. Looking for these various properties, we find them all united in a remarkable degree in the position of Albany.

From this place, by steamboat, canal boat, or railroadcar, troops and munitions could be transported in a short time to Buffalo, or onward to Detroit, to Oswego, to Sackett's Harbor, to Plattsburg, to Boston, and along the coast of New England; to New York by steamboat now, and soon by railroad also; and thence onward to Philadelphia, Baltimore, Washington, and the heart of the southern country if necessary. In a word, Albany is a great central position, from which radiate the principal lines of communication to the north, to the south, to the east, and to the west; and combines so many advantages for a military depot that the expediency of occupying it and thus availing ourselves of those advantages would seem to be manifest.

Estimated expense of the purchase of land, and the construction of barracks and other buildings..... 300,000

Total for northern frontier..... 2,160,000

The board beg leave to observe, in conclusion, that, in the preparation of the estimates submitted, they have not attempted to aim at precision. Hence the amounts stated for the various objects are to be regarded only as approximations. They could not be anything more, on the data used, which, for want of minute surveys and reconnoissances, were necessarily vague. It is believed, however, that the results presented will be found sufficiently accurate for the general purposes contemplated by the resolution under which this report has been prepared.

For the board,

JOS. G. TOTTEN,
Colonel of Engineers.

Estimated cost of ordnance of all kinds required for the armament of the northern frontier, embracing cannon mounted, and one hundred rounds of ammunition for each piece.

Armament of—	CANNON.														CARRIAGES.								
	24-pounder guns.	18-pounder long guns	18-pounder medium guns.	12-pounder long guns.	12-pounder field guns.	6-pounder field guns.	Carronades.	24-pounder howitzers	12-pounder howitzers.	8-inch howitzers, heavy.	10-inch heavy mortars	8-inch light mortars.	Cohorns.	Total number of cannon.	For 24-pounders.	For long 18 pounders.	For long 12-pounders.	For medium and field cannon.	For carronades.	For 8-inch howitzers.	For 10-inch heavy mortars.	For 8-inch light mortars.	For cohorns.
Works at Falls of St. Mary	----	---	4	----	----	4	----	----	2	----	----	2	----	12	----	----	----	10	----	----	----	2	----
Fort at Michilimackinac	4	----	----	----	----	4	----	----	2	----	----	2	----	12	4	----	----	6	----	----	----	2	----
Fort of Lake Huron	----	----	4	----	----	4	----	----	2	----	----	2	----	12	---	----	----	10	----	----	----	2	----
Fort for Spring Wells, below Detroit	----	----	10	----	4	4	----	2	2	----	----	4	----	26	----	----	----	22	----	----	----	2	----
Fort for Buffalo and Black Rock	----	----	10	----	4	4	----	2	2	----	2	2	----	26	----	----	----	22	----	----	2	2	----
Fort Niagara	----	12	4	----	4	4	----	2	2	----	2	2	4	36	----	12	----	16	----	----	2	2	4
Fort Ontario at Oswego	----	8	----	9	4	4	----	2	2	----	2	2	4	37	----	8	9	12	----	----	2	2	4
Sackett's harbor	----	----	10	----	4	4	----	2	2	----	2	2	----	26	----	----	----	22	----	----	2	2	----
Fort at the narrows of the St. Lawrence	----	----	10	----	4	4	----	2	2	----	----	4	----	26	----	----	----	22	----	----	----	4	----
Fort on New York side, at Champlain	64	10	----	----	4	4	20	2	2	8	4	4	4	126	64	10	----	12	20	8	4	4	4
Fort on opposite side	64	10	----	---	4	4	20	2	2	8	4	4	----	126	64	10	----	12	20	8	4	4	4
Plattsburg	----	----	4	----	4	4	----	2	2	----	----	2	----	18	----	----	----	16	----	----	----	2	----
Headwaters of the Kennebec	----	----	4	----	4	8	----	2	4	----	----	2	----	24	----	----	----	22	----	----	----	2	----
Headwaters of the Penobscot	----	----	4	----	4	8	----	2	4	----	----	2	----	24	----	----	----	22	----	----	----	2	----
Calais	----	----	4	----	4	8	----	2	4	----	----	2	----	24	----	----	----	22	----	----	----	2	----
	132	40	68	9	48	72	40	24	36	16	16	38	16	555	132	40	9	248	40	16	16	38	16

Estimated cost of ordnance of all kinds, &c.—Continued.*

Armament of—	PROJECTILES.								POWDER.	COST OF ARMAMENT.				
	24-pounders.	18-pounders.	12-pounders.	6-pounders.	8-inch shells.	10-inch shells.	24-pounder shells	12-pounder shells.	Pounds of cannon powder.	Cannon.	Carriages.	Projectiles.	Powder.	Total amount.
Works at Falls of St. Mary	------	400	------	400	200	------	------	200	2,700	$1,540	$3,160	$1,016	$540	$6,256
Fort at Michillimackinac	400	------	------	400	200	------	------	200	3,900	2,040	1,960	1,128	780	5,908
Fort of Lake Huron	------	400	------	400	200	------	------	200	2,700	1,540	3,160	1,016	540	6,256
Fort for Spring Wells, below Detroit	------	1,000	400	400	400	------	200	200	6,900	3,630	6,920	2,376	1,380	14,306
Buffalo and Black Rock	------	1,000	400	400	200	200	200	200	8,700	4,010	7,160	2,928	1,740	15,838
Fort Niagara	------	1,600	400	400	200	200	600	200	14,300	6,170	8,460	3,760	2,860	21,250
Fort Ontario at Oswego	------	800	1,300	400	200	200	600	200	12,200	6,170	9,650	3,058	2,440	21,318
Sackett's harbor	------	1,000	400	400	200	200	200	200	10,200	4,010	7,160	2,928	1,740	15,838
Fort at the narrows of the St Lawrence	------	1,000	400	400	400	------	200	200	8,400	3,630	6,920	2,356	1,680	14,586
Fort on New York side at Champlain	6,400	1,000	400	400	1,200	400	2,600	200	52,250	31,350	32,620	12,280	10,600	86,850
Fort on opposite side	6,400	1,000	400	400	1,200	400	2,600	200	52,250	31,350	32,620	12,280	10,600	86,850
Plattsburg	------	400	400	400	200	------	200	200	5,100	2,290	4,960	1,416	1,020	9,686
Headwaters of the Kennebec	------	400	400	800	200	------	200	400	6,000	2,890	6,760	1,610	1,200	12,460
Headwaters of the Penobscot	------	400	400	800	200	------	200	400	6,000	2,890	6,760	1,610	1,200	12,460
Calais	------	400	400	800	200	------	200	400	6,000	2,890	6,760	1,610	1,200	12,460
	13,200	10,800	5,700	7,200	5,400	1,600	8,000	3,600	197,600	106,400	145,030	51,372	39,520	342,322

For the board,

JOSEPH G. TOTTEN, *Colonel of Engineers.*

WASHINGTON, *April* 23, 1840.

REPORT ON THE WESTERN FRONTIER, FROM THE SABINE BAY TO LAKE SUPERIOR.

The principles which should govern in fortifying the seaboard are not considered applicable to our inland frontier, which will very rarely be found to call for regular fortifications. Hence, in relation to that portion of the frontier now under consideration, the duty of the board will be performed by indicating the military positions or stations which should, in their opinion, be occupied by troops, in order to accomplish the objects in view, and in presenting estimates of the probable cost of constructing the necessary barracks, quarters, and storehouses, combined with such works of defence as circumstances may appear to require, to insure their protection against the attacks to which they may be exposed.

The want of personal knowledge, on the part of the board, of our extensive western frontier, and the very limited surveys which have been made in that quarter, have somewhat embarrassed them in the selection of positions; but they desire to be understood as merely designating places in a geographical sense, leaving the particular sites on which the works should be erected to be determined hereafter, by minute examinations of the country at and around those positions; which become the more important, inasmuch as the original locations of some of the places that will be recommended to be retained have been considered faulty.

The southern section of this frontier, extending from the Sabine bay to the Red river, borders all the way on Texas, and has, it is believed, little or nothing to apprehend from Indian aggressions. The Comanches, the only tribe of any power in that quarter, are represented as gradually receding to the westward, and the progress of the Texan settlements will tend to push them further from our border. But our relations with the Texan republic, however amicable they may be at present, would seem to require that some military force should be stationed on or near the boundary line; and the board therefore recommend the establishment of two small posts on the Sabine river, suppressing Fort Jesup, which is considered too far within the frontier, or retaining it merely as a healthy cantonment.

As these would be posts of observation, having reference to national police more than to military defence, they ought to be established on the river where the principal roads cross it, by which we should be enabled to supervise the chief intercourse with our neighbors by land, and, at the same time, control the navigation of the Sabine. The points where the Opelousas and Natchitoches roads, leading to Texas, strike the river, are therefore recommended as the positions which should be occupied, and at which barracks for two or three companies, defended by light works, should be constructed.

The middle section, which extends from the Red river to the Missouri, is by far the most important portion of the whole of our western frontier. It is along this line that the numerous tribes of Indians who have emigrated from the east have been located; thus adding to the indigenous force already in that region an immense mass of emigrants, some of whom have been sent thither by coercion, with smothered feelings of hostility rankling in their bosom, which, probably, waits but for an occasion to burst forth in all its savage fury. These considerations alone would seem to call for strong precautionary measures; but an additional motive will be found in our peculiar relations with those Indians.

We are bound, by solemn treaty stipulations, to interpose force, if necessary, to prevent domestic strife among them, preserve peace between the several tribes, and to protect them against any disturbances at their new homes by the wild Indians who inhabit the country beyond. The government has thus contracted the two-fold obligation of intervention among, and protection of, the emigrant

tribes, in addition to the duty which it owes to its own citizens of providing for their safety.

It appears to the board that this obligation can only be properly fulfilled by maintaining advanced positions in the Indian country with an adequate restraining military force, and that the duty of protecting our own citizens will be best discharged by establishing an interior line of posts along the western border of the States of Arkansas and Missouri as auxiliaries to the advanced positions, and to restrain the intercourse between the whites and the Indians, and serve as rallying points for the neighboring militia in times of alarm.

With these views they would recommend the maintenance of Fort Towson, on Red river, and Fort Gibson, on the Arkansas, and the establishment of a post at the head of navigation on the Kansas, and one at Table creek, on the Missouri, below the mouth of the Big Platte, as constituting the advanced positions on this portion of the frontier.

For the secondary line intended for the protection of the border settlements the board would adopt the positions which have been selected by a commission of experienced officers along the western boundary of Arkansas and Missouri, at some of which, it is understood, works are already in progress, namely: Fort Smith, on the Arkansas river; Fort Wayne, on the Illinois; Spring river and Marais de Cygne; terminating to the north at Fort Leavenworth, on the Missouri. They would also recommend the establishment of one or two intermediate posts between the Arkansas and Red rivers, if, on further examination of the country, suitable positions can be selected near the State line. It is not deemed advisable to establish those posts on the route of the road lately surveyed, which (especially the southern portion) is considered too far in advance of the border settlements to accomplish the object in view; but if eligible positions cannot be found along the line, then a post on the road where it crosses the Poteau river, which is not very remote from the settlements, might have a salutary influence.

On the northern portion of this frontier, extending from the Missouri river to Lake Superior, the board would recommend the establishment of a post near the upper forks of the Des Moines river, the maintenance of Fort Snelling, on the Mississippi, and the ultimate establishment of a post at the western extremity of Lake Superior. The last is suggested with some qualification for want of the necessary information by which to determine the channel of communication to that remote position. Whether it shall be through Lake Superior or by the Mississippi and its tributaries, it would in either case be difficult in peace and next to impracticable in time of war. As the position has, however, important geographical relations, and would enable us to extend our influence and control over the Indians in our territory, and afford protection to our traders in that remote region, it would seem to be worthy of early occupation if its maintenance can be rendered secure—a point which can only be determined by a careful examination of the country.

It is nevertheless recommended to retain Fort Crawford, at Prairie du Chien, Fort Winnebago, at the portage of the Fox and Wisconsin rivers, and Fort Howard, at Green bay. These posts are deemed necessary to protect that portion of our frontier, while at the same time they serve to cover an important line of intercommunication between the northern lakes and the western waters.

It has not been thought expedient to continue the interior line of defence suggested for the middle section of this frontier across from the Missouri to the Mississippi river. Our Indian relations in that quarter assume a different aspect. There is no special guarantee of perpetual occupation of that country by the tribes who now inhabit it, nor can it be doubted that they will ultimately be pushed by the advance of our population to the west of the Missouri river. Under those circumstances it is believed that the intermediate post recommended to be established on the Des Moines river, co-operating with the posts on the Missouri and those on the Upper Mississippi, will afford adequate protection to

the border settlements against any attacks to which they are likely to be exposed.

The board have not felt called upon by the terms of the resolution under which they act to project a plan of operations for the western frontier, nor to go into an estimate of the military force that will be required there, further than was necessary to determine the extent of accommodations to be erected and the expense which these will involve. They would, however, observe, that the positions which have been designated will not of themselves have the desired influence in restraining the Indian tribes and protecting our border settlements without the aid of a respectable force, of which a full proportion should be mounted and held disposable at all times for active service in the field. To effect this the works should be so constructed that, while they will afford adequate accommodations for all the troops when they are not actively employed, their defence may be safely intrusted to a small force. With these precautionary measures, and the co-operation of small but effective reserves posted within sustaining distances of the several sections of the frontier, it is believed that peace may be preserved and the first onset of war met until the militia of the neighboring country could be embodied and brought into the field.

It only remains to recapitulate the positions which have been recommended to be occupied, apportion the requisite force, and present a conjectural estimate of the cost of erecting the accommodations and defences deemed necessary at each.

1. For quarters for 100 men at the post on the Sabine where the Opelousas road crosses that river, including defences	$20,000
2. For quarters for 100 men at the post on the Sabine where the Natchitoches road crosses, including defences	20,000
3. For permanent quarters and other accommodations for 500 men at Fort Towson, including defences	100,000
4. For permanent quarters and other accommodations for 1,000 men at Fort Gibson, including defences	180,000
5. For quarters for 300 men at the post on the Kansas river, including defences	60,000
6. For quarters and other accommodations for 500 men at the post at Table creek, near the mouth of the Platte, on the Missouri, including defences	75,000
7. For quarters and other accommodations for 400 men at the post on the Des Moines river, including defences	60,000
8. For the enlargement and repair of Fort Snelling, to fit it for the accommodation of 300 men, including defences	30,000
9. For quarters for 400 men at the post at the western extremity of Lake Superior, including defences	50,000

INTERIOR LINE.

10. For quarters for 200 men at the post between the Red and Arkansas rivers, including defences	50,000
11. For completing quarters and other accommodatins for 200 men at Fort Smith, including defences	50,000
12. For completing quarters and other accommodations for 200 men at Fort Wayne, including defences	50,000
13. For quarters and other accommodations for 200 men at the post at Spring river, including defences	50,000

14. For quarters and other accommodations for 200 men at the post at Marais de Cygne, including defences	$50, 000
15. For completing quarters and other accommodations in progress for 400 men at Fort Leavenworth, including defences	50, 000
Total for western frontier	895, 000

All which is respectfully submitted.
For the board,

JOS. G. TOTTEN,
Colonel Engineers.

Estimated cost of ordnance of all kinds required for the armament of the western frontier, embracing cannon mounted and one hundred rounds of ammunition for each piece.

	CANNON.					CARRIAGES.		PROJECTILES.				POWDER.	COST OF ARMAMENT.				
	18-pounder guns, medium.	6-pounder guns.	12-pounder howitzers.	8-inch light mortars.	Total number of cannon.	For medium and field cannon.	For 8-inch light mortars.	18-pounders.	6-pounders.	12-pounder shells.	8-inch shells.	Pounds of powder.	Cannon.	Carriages.	Projectiles.	Powder.	Total amount.
Post on the Sabine at the crossing of the Opelousas road.	2	2	1	1	6	5	1	200	200	100	100	1,550	$770	$1,455	$508	$310	$3,043
Post on the Sabine where the Natchitoches road crosses.	2	2	1	1	6	5	1	200	200	100	100	1,550	770	1,455	508	310	3,043
Proposed establishment for 500 men at Fort Towson	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
Proposed establishment for 1,000 men at Fort Gibson	.....	10	.....	.....	10	10	.....	...	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
Proposed establishment for 300 men at the Kansas river	.....	10	....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
Proposed establishment for 500 men at a post on Table creek	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
Proposed establishment for 400 men at a post on the Des Moines	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
Repairs, &c., of Fort Snelling for 300 men	.....	10	.....	.....	10	10	.....	.....	1,000	.....	....	1,500	1,000	1,000	250	300	2,550
Proposed establishment for 400 men at a post on western extremity of Lake Superior	4	12	1	2	19	17	2	400	1,200	100	200	4,150	2,892	2,523	1,166	830	7,411
Interior line.																	
For proposed establishment for 200 men at a post between Red and Arkansas rivers	.....	10	.....	....	10	10	...	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
For establishment at Fort Smith for 200 men	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
For establishment at Fort Wayne for 200 men	.....	10	.....	....	10	10	....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
For establishment at Spring river for 200 men	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
For establishment at Marais de Cygne for 200 men	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
For establishment at Fort Leavenworth for 400 men	.....	10	.....	.....	10	10	.....	.....	1,000	.....	.....	1,500	1,000	1,000	250	300	2,550
	8	136	3	4	151	147	4	800	13,600	300	400	25,250	16,432	17,433	5,182	5,050	44,097

For the board

JOSEPH G. TOTTEN, *Colonel Engineers.*

REPORT ON THE ARMORIES, ARSENALS, MAGAZINES, AND FOUNDERIES, WHICH ARE MENTIONED IN THE THIRD SECTION OF THE RESOLUTION OF THE SENATE IN THE FOLLOWING WORDS, VIZ:

"The armories, arsenals, magazines, and founderies, either constructed or deemed necessary, with a conjectural estimate of the expense of constructing such of said establishments as may not yet be completed or commenced, but which may be deemed necessary."

The necessary arsenals and magazines will be first considered, as armories and founderies, being manufactories of arms destined for general distribution, do not pertain exclusively to any particular frontier. Arsenals and ordnance depots will be understood to include magazines in the general sense of the term; and these establishments will be rated, according to their relative importance or magnitude, in three classes:

I. Arsenals of construction, which embrace also repairs, and for deposit.

II. Arsenals for repairs and for deposit.

III. Depots, or places for deposit and safe-keeping of arms, and other ordnance stores.

I. *On the northern frontier, from Lake Superior to Passamaquoddy bay.*—An arsenal or ordnance depot will be required at some suitable point on the Upper Mississippi; and Fort Crawford, at Prairie du Chien, offers a good position, particularly with reference to supplying the line or tract of country extending southwesterly from Fort Snelling, through the Territory of Iowa, towards the Des Moines river, as well as northwardly toward Lake Superior, and eastwardly through the Territory of Wisconsin to Lake Michigan. The expense of constructing this depot, on a scale commensurate with the probable importance that must be given to it, will be not less than..... $70,000

forming an arsenal of the third class.

The Detroit arsenal, on the river Rouge, twelve miles from Detroit, now nearly finished, is an arsenal of the second class, destined to supply the lake frontier from the Sault de St. Marie, the outlet of Lake Superior, to Lake Michigan and Lake Erie..... 20,000

will effect the completion of this arsenal.

Alleghany arsenal, at Pittsburg, an establishment of the first class, is also available for the supply of the lake frontier, as well as the western frontier, through the western arsenals.

Rome arsenal, of the third class, is the place for deposit for stores required at the posts on Lake Ontario.

Champlain arsenal, at Vergennes, Vermont, also of the third class, will supply the posts on Lake Champlain and the northern part of Vermont. But the whole lake frontier, and the arsenals in that region, may be supplied from the Watervliet arsenal, near Albany, which is an establishment of the first class, and admirably located for the preparation and sending forth of ordnance stores, not only to the northern, but likewise to the maritime frontier. The periods of free navigation of the New York canals and the Hudson river are used for the distribution from Watervliet of such supplies as may be required in the winter season.

The Kennebec arsenal, at Augusta, Maine, of the second class, is designed to supply the northern and eastern frontiers of that State, and part of New Hampshire; but arms would be furnished to the frontier of the latter State from Springfield armory, and

ordnance stores would be passed up the valley of the Connecticut from arsenals either east or west of that river.

It may become necessary to establish a depot on the Penobscot, at Bangor. But this point is only sixty miles from Augusta; and no estimate of the cost is furnished, as the deposit would probably be temporary.

II. *The maritime frontier from Passamaquoddy bay to Cape Florida.*—The Kennebec arsenal is the place of deposit for the greater part of the sea-coast of Maine; the sum of..... $30,000
will finish the additions required.

The Watertown arsenal, five miles in the rear of Boston, also of the second class, will supply the westerly part of Maine, the sea-coast of New Hampshire, Massachusetts, and Rhode Island; and 25,000
will be required for additional buildings and enclosures.

Both the Kennebec and Watertown arsenals are of considerable extent, with every facility for being converted into arsenals of the first class; and the construction of gun-carriages, necessary for arming the forts and batteries within the limits above stated, may be effected at both or either. The Watervliet arsenal, before mentioned, is, however, the principal one relied on for supplies required, not only from Cape Cod to the capes of Delaware bay, but for much of the maritime as well as the lake frontier. Additional quarters and storehouses at this post will cost..... 50,000

A depot in the harbor of New York receives articles from Watervliet, during the season of navigation, which are transhipped, in time of peace, to all parts of the coast and to the Mississippi. During a war, supplies would be furnished from arsenals in the more immediate vicinity of the sea-coast defences, viz: Frankford arsenal, six miles above Philadelphia, is of the second class, and will supply works on Delaware bay and river; Pikesville arsenal, of the third class, four miles from Baltimore; Washington arsenal and Fort Monroe arsenal, both of the first class, will furnish what may be required for the sea-coast defences of Chesapeake bay and Potomac river. The last mentioned was established with special reference to the construction of the gun-carriages required at that post and at Fort Calhoun. It has been found advantageous, however, to construct there carriages for other southern forts; but it cannot be considered as a permanent establishment of the first class, to be kept up after the occasion which called for it shall have passed by.

The North Carolina arsenal, at Fayetteville, on Cape Fear river, is under construction, and was originally intended to be made one of the first class. Doubts have been entertained whether it ought to exceed those of the second class; but the plan is such that it can at any time be extended according to the original design. The sum of eighty thousand dollars will be required to finish it as one of the second class..... 80,

Charleston depot is at present of diminutive capacity. It is proper to enlarge it, and thirty thousand dollars will make it useful as a place of deposit..... 30,

Augusta arsenal, at Augusta, Georgia, is of the second class, and with the two last mentioned will furnish supplies required from Chesapeake bay to Cape Florida.

The Augusta arsenal has its powder magazine detached and

located at an inconvenient distance, beyond the control of the force at the post. For the construction of a new magazine, and other necessary additions to this establishment, sixty thousand dollars will be required..... $60, 000

Several of the arsenals have been built upwards of 20 years, and require extensive repairs and additions, which it is supposed may be effected, from time to time, by the aid of annual appropriations, amounting in all to about..... 180, 000

III. "*The Gulf frontier, from Cape Florida to Sabine bay.*"—Appalachicola arsenal, at Chattahoochee, just below the junction of the Chattahoochee and Flint rivers; Mount Vernon arsenal, on the Mobile river; and Baton Rouge arsenal, on the Mississippi, are all establishments of the second class, and destined to supply the whole Gulf frontier, and the forts below New Orleans, on the Mississippi. About sixty thousand dollars will be required to complete them, and erect some additional buildings at Baton Rouge.. 60, 000

IV. "*The western frontier, from Sabine bay to Lake Superior.*"—Baton Rouge arsenal, already mentioned, will furnish supplies for posts on the Sabine and Red rivers.

Little Rock arsenal, just commenced, will be the source of supplies for posts on the Arkansas, and along the western border of that State. It will necessarily become at first an arsenal of the second class, with the depot at Memphis as subsidiary, and will require one hundred thousand dollars to complete it..... 100, 000

St. Louis arsenal is a large establishment of the second class, but, with very little expense can be raised to the first class; with the subsidiary depot at Liberty, on the Missouri, it will supply the posts on that river, the western border of the State, the posts on the Des Moines, and the Upper Missippi.

A depot at Prairie du Chien, mentioned in relation to supplies required in the direction of Lake Superior, and southwesterly, through the Territory of Iowa, would be sustained by the St. Louis arsenal, and completes the chain upon the several frontiers embraced in the resolution.

Total amount required for constructions, additions, and repairs to arsenals and depots..... 705, 000

Armories.

The two national armories at Springfield, Massachusetts, and Harper's Ferry, Virginia, are the only public establishments for the manufacture of small arms. They furnish about twenty-five thousand stand of arms yearly. This number might be extended; but it has been an object of solicitude with the government for nearly twenty years past to establish an armory west of the Alleghanies.

Commissioners were employed in 1823 to examine the western waters, with a view to the location of an armory. Many sites were surveyed, and careful estimates made of the cost of an armory at each, with an exhibit of their several advantages and disadvantages. The result of their investigations may be found at large in Gales & Seaton's reprint of American State Papers, folios 729 to 790 inclusive, volume 2, Military Affairs.

It is perhaps fortunate that the place then selected was not adopted by Congress: for, since that period, the immense increase, not only of population and the general resources of the western region, but of the particular articles required for the manufacture of arms, by the discovery of masses of coal, and the exten-

sive working of iron mines, where nothing of the kind was then found, has shown that an armory should be located much further west.

The data collected by the commissioners in 1823 may be usefully applied in estimating the probable cost of an armory at the present day, making suitable allowances for the increased price of everything connected with such an establishment. This cost will be found to vary, according to localities of positions, from $280,000 to $500,000 for an armory capable of furnishing twelve thousand muskets per year. It will therefore be stated at the mean of $390,000, to which twenty per cent. should be added; making the sum of..... $468,000

Another mode of proceeding proposed, consists in forming an establishment complete in itself, of limited extent, and having the great mass of component parts of arms manufactured by the piece in private workshops, and only the inspecting, assembling, and finishing be done at the public works. This course would materially reduce the first cost, or necessary expenditure for buildings and tools. It also admits of extension to a great amount of fabrication, with but little additional cost of permanent fixtures. But, whichever mode is followed, or whatever site may be selected for its location, there can be no question of the necessity for an armory on the western waters; and as regards a proper location, it may be observed, that, to consider the relations of an armory in the same light as that of an arsenal or magazine, would be an error; the means of production being the principal requisite for the one, and those of transportation or distribution for the others.

Total required for an armory on the western waters..... 468,000

Foundries.

The United States own no cannon foundery. Although possessing some ore beds, from which iron of approved quality for casting cannon has long been made, yet artillery of every description is procured from private founderies. This subject has been so recently before Congress, and so ably treated, that nothing will be said further than to state the probable cost of such an establishment; and here, again, so much depends upon the location, that only an approximation will be attempted. A report from the War Department made to the 24th Congress, 1st session, Doc. No. 106, states the cost of a foundery, to be located at Georgetown, in the District of Columbia, at $312,000. If this estimate is correct, (and it is known that great care was bestowed on its preparation,) it may be assumed that about..... $300,000

will be required for a foundery when favorably located for the use of water power. Should steam power be adopted, the first cost of the establishment would be less, while the annual expenditure would be greater than for water power.

As regards a suitable location for a foundery, the great weight and bulk of the raw materials used in the manufacture of cannon, and the weight of heavy guns, which are required for use only on the seaboard, would seem to demand that particular attention should be given to the means of transportation both to and from the foundery.

Total amount required for a foundery..... 300,000

Recapitulation.

Total amount required for constructions, additions, and repairs to arsenals and depots	$705,000
Total amount required to establish an armory on the western waters	468,000
Total amount required to establish a national foundery	300,000
Total	1,473,000

All which is respectfully submitted.
By order of the board,

JOS. G. TOTTEN,
Colonel of Engineers.

MEMORIAL OF EDMUND P. GAINES.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The memorial of Edmund Pendleton Gaines, a major general in the army of the United States, commanding the western division, respectfully showeth: That, believing the federal and State constitutions guarantee and consecrate to every free citizen capable of bearing arms the *right* and *duty* of participating alike in the civil and military trusts of the republic, solemnly requiring the soldier to exert his every faculty "*in peace to prepare for war*," so that on the recurrence of war he may be well qualified to fight the battles of his country in the greatest possible triumph, and at the least possible cost of blood and treasure; requiring him, moreover, to study and respect her political and social institutions; and requiring the statesman to discipline his mind for the state and national defence, by adapting his civil acts and occasional military studies to the purposes of the national defence and protection, as well against foreign enemies in war as against the home incendiary and other *criminal offenders in peace;* thus rendering the statesman and soldier equally familiarized with their common kindred duties of *self-government* and *self-defence:* by a knowledge of which our independence was achieved, and without which this inestimable blessing cannot be preserved;—your memorialist, a native Virginian, a citizen of Tennessee, schooled in *her cabins* and *her camps* to the profession of arms, has, within the last seventeen years, matured a system of national defence, to which he now respectfully solicits your attention and support: a system of national defence which the late giant strides of invention and improvement in the arts have rendered *indispensable to the preservation of the Union:* a system of national defence which recommends itself peculiarly to the central, southern, and Atlantic States, as well as to those of the north and west; as it assures to our isolated central States of Tennessee and Kentucky, and to all the western States of Ohio, Indiana, Illinois, Missouri, and Arkansas, in peace, commercial advantages equal to those enjoyed by the most favored eastern, Atlantic, or southern States; and *in war*, giving to the disposable fighting men of these central and western States the inestimable privilege of flying with unprecedented certainty, celerity, and comfort to any of our vulnerable seaports, to aid our brethren of the border States to repel the invading foe; and to accomplish this essential duty in one-tenth part of the *time*, and one-tenth part of the *expense*

that would attend such an operation over our present bad roads. But, above all, to accomplish these great and good objects by means that will more than double the value of our State and national domain, and without expending a dollar that may not be insured to be replaced in the public coffers in from seven to ten years after the completion of the work here recommended.

Your memorialist is admonished by the universal employment of steam power, and its applicability to every description of armament hitherto moved upon the sea by wind and canvas, or upon the land by animal power, that an epoch is at hand in which the art of war, in whatever regards the attack and defence of seaports, has undergone an unparalleled revolution.

Hitherto the transition *from peace to war* between neighboring nations, though sometimes sudden and unexpected, was usually preceded by some significant note of preparation not easily mistaken; and after the actual commencement of hostilities there were frequent opportunities and ample time for the belligerents, and more particularly for the nation acting upon the unerring principle of *self-defence*, to complete the *work of preparation for war* before the *work of destruction* upon her principal seaport towns had been begun by the invading foe. Hitherto the enemy's fleets were to be seen for weeks, often, indeed, for months in succession, "*standing off and on*," waiting for suitable winds and weather to enable them to enter and attack the destined port, and then, in case of accident, to carry them safely out again—winds such as could never be calculated on with anything like certainty. Hence the great and unavoidable delay in the attack by fleets propelled by wind and sails has often enabled the people of the threatened seaports to throw up works of defence: and after slowly marching their interior volunteers and other forces at the rate of twenty miles a day, they would in time be so well prepared for action that the menacing invaders have but seldom ventured to attack places of much importance, but have usually condescended to vent their prowess in a petty border war against villages and private habitations, as upon the Chesapeake bay and the Georgia sea-coast in the war of 1812, 1813, and 1814.

If the obvious effect of steam power, in the rapid movement of everything to which it has been applied around us, has not been sufficient to convince us of the expediency and transcendent advantages *in war* and *in peace* of the proposed immediate work of preparation, by steam power, to guard against the incalculable disasters that must otherwise attend the sudden outbreak of war with any of the great nations of Europe able to send against us even a small fleet propelled by steam power, it would seem obvious that the late naval and military operations in the harbor of Vera Cruz were sufficient to prove clearly, that to bring a hostile fleet *inside the breakers* of a seaport of the country invaded, and within the desired range of the best of cannon and mortars for *red-hot shot* and *shells* of one of the strongest castles in America, was the work of but two hours; and that the utter destruction of that castle by three small ships-of-war required but four hours more.

To provide for the defence of our seaports, and thus effectually to obviate the possibility of a sudden calamity like that which has befallen the castle of San Juan de Ulloa, and to enable us to repel by the agency of steam power every invasion suddenly forced upon us by fleets propelled by steam power, I now submit for the consideration of the national legislature the project and explanatory views which follow:

ART. I. *Floating batteries for the defence of the seaports and harbors of the United States.*

1. Your memorialist proposes the immediate construction of from two to four large floating batteries for the defence of each navigable pass into the Mississippi river, and from two to five others for the defence of every other navigable inlet leading into any of the principal seaports of the United States. Each floating

battery to be from 200 to 300 feet long, and from 90 to 150 feet wide—the bottom to be as nearly flat as the best tested principles of naval architecture will allow, consistently with the great weight of timber and metal to be provided for, with the requisite facility of the movement that will be required over shoal water. Each floating battery to be secured in the bottom and sides with copper sheeting, and copper or iron bolts; and on the upper parts, exposed to the enemy's shot and shells, with the thickest sheet iron, and iron bolts; and otherwise made capable of sustaining a heavier broadside than the largest of our ships-of-war is capable of sustaining; to carry from one hundred and twenty to two hundred heavy cannon—say long 24 and 32-pounders, with some 80-pounders for carrying hollow shot, together with some mortars for throwing shells; with a furnace for heating red-hot shot for illuminating the enemy's fleets and transports. Each floating battery to have state-rooms for the comfortable accommodation of from 600 to 1,000 men, with storerooms for all the munitions of war requisite for that force for six to eight months' service. Each floating battery to be attended and propelled by such number of tow-boats as the exigencies of the service shall from time to time demand—to be permanently stationed in each harbor in time of peace, and in war as many tow-boats to be chartered as the commanding officer may deem necessary to render the floating batteries in the highest degree efficient. As in war tow-boats will seldom be needed for the merchant service, an ample supply of them, particularly in our large seaports, may be chartered on moderate terms: for example, in the harbor of New Orleans it is believed that twelve tow-boats, with several steamboats having the best of engines to be converted into tow-boats, would be thrown out of employment during a state of war. These could be usefully employed in the United States service, in aid of the public tow-boats and floating batteries. But should this reliance be deemed unsafe, we can readily adopt the obvious alternative of having each floating battery supplied with two tow-boats of great power, as in war they would be needed near the batteries, ready to wield them in the event of an attack, and at other times to act as tenders in supplying them with men and munitions of war. In a state of peace the floating batteries, it is believed, would require but one tow-boat each, excepting when employed in deepening the ship channels—a work which may be accomplished with the most perfect ease and to any desirable extent, wherever the bottom of the channel consists of mud and sand, as in all the outlets of the Mississippi. This important work will be done by attaching to the bottom of each floating battery a framework of *ploughs* and *scrapers of iron*, made to *let down* and *raise up* at pleasure, according to the hardness or softness of the clay and sand, or mud, of which the bar or bottom of the channel may be composed. If very hard or tough, the ploughs and scrapers might not break up and take off more than two to four inches in depth at one movement; but where the bar is composed entirely of soft mud, as that at Balize and the Northeast and Southwest passes have often been, from four to six inches in depth, it is believed, may be carried off at once—wherever the bar is very narrow, and in the immediate vicinity of very deep water, which would be the reservoir or place of deposit to which the mud and sand would be removed. But in a state of peace, when the batteries should not be employed in deepening the ship channels, their extra tow-boats might be advantageously employed in the merchant service.

2. Floating batteries such as are here proposed, consitute, as your memorialist verily believes, the only sure means of defence of the passes into our seaports against ships-of-war propelled by steam power—means of defence without which it is in the power of any nation, or community of men, or pirates, capable of fitting out ten or even five such steamships-of-war as those employed in the destruction of the castle of San Juan de Ulloa, to destroy the city of New York or New Orleans by fire, with the newly invented 80-pound cannon shot and shells, in a single day, at any season of the year; approaching them in the

night, and taking them by surprise: as with such a fleet, well manned and supplied, either city could be fired in five hundred places in one hour; and in a few hours more thousands of the most splendid edifices, by which these magnificent cities are embellished, would be reduced to ruin and desolation.

3. This opinion has not been formed without a full knowledge of the fact that both New York and New Orleans number among their citizens many men and volunteer corps of military science, patriotism, and unsurpassed chivalry. But these fine volunteer corps, attacked by means and by weapons hitherto unknown to them, or unprovided for, and thus taken by surprise, may share the fate of the heroic Danes at Copenhagen, when attacked by Nelson; with this striking difference in their favor, and against us, the Danes were not taken by surprise. A protracted negotiation with England preceded the attack; and after the British fleet had made its appearance on the coast of Denmark, and in sight of their harbor, they had some three or four days for preparation; they had a fleet nearly equal to that brought into action against them by Nelson, together with an army of some thousands of men, seamen, soldiers, and volunteers, with several fortifications on land, aided by some floating batteries—presenting altogether an armament of upwards of 1,000 cannon, with an immense supply of small arms and every requisite munition of war. In this state of preparation the harbor of Copenhagen was entered in open day by twelve ships of the line—three of which were rendered nearly useless by having got aground; with nine ships of the line, therefore, Nelson sustained a close action for four hours, during which time his loss was less than one thousand, while the loss of the Danes was near six thousand men, together with their fleet—to say nothing of the losses sustained by the inhabitants of the city. This was the result of an attack with nine ships of the line, propelled by wind and sails, upon the seaport of Copenhagen, when strongly fortified and defended by large naval and land forces. What then must be the fate of such a city as New York, or New Orleans without any effective means of defence, attacked by ten, or even five ships-of-war, armed with the newly invented 80-pounders, and propelled by steam power? We know that a fleet consisting of this description of ships-of-war may cross the Atlantic from a European port to New York in the short space of fourteen days' time, and that it may enter our harbors in the night, and be seen at our wharves, with matches lighted ready for action, at daylight in the morning—ready to take or destroy money or property amounting to ten times as much as all the floating batteries and railroads embraced in the proposed system of national defence would cost. In the outrageous attack on Copenhagen, England was fighting for *the dominion of the sea*. Denmark and Sweden, with Russia and France, were then nobly opposing that lawless pretension, as we, the United States, have long opposed it. Nelson, on embarking in the expedition, is reported to have said to his commander, Admiral Parker, "I hope we shall give our northern enemies that hailstorm of bullets, which gives *our dear country the dominion of the sea*; we have it, and all the devils in the north cannot take it from us if our wooden walls have fair play." This is the language of a truehearted British seaman and soldier. Such was the noble bearing of our own Decatur, when he exclaimed, "Our country! in her intercourse with foreign nations may she always be right; but in war may she always triumph—right or wrong!"

In the memorable attack on Copenhagen, it is worthy of remark here that the experienced Admiral Nelson, who had won more great naval victories than any other commander had, previous to the action stated to the commander-in-chief the following opinion: "If the wind is fair, and you determine to attack the ships and Crown islands, *you must expect the natural issue of such a battle—ships crippled, and perhaps one or two lost; for the wind which carries you in will most probably not bring out a crippled ship.*" Nelson, however, had the good fortune, after taking and destroying a fleet nearly equal to his own, and killing six times as many men as he lost in action, to sail out of the harbor, which

he had filled with wrecks, without the loss of a single British vessel, though he had several greatly damaged.

4. With floating batteries, such as are here proposed, it is more than probable that the brave Danes would have destroyed the whole of Nelson's fleet without sustaining the loss of a vessel, a battery, or one hundred men. The floating batteries of the Danes, like those of the French and Spaniards at the siege of Gibraltar in the year 1783, were inefficient, simply because they were unwieldy. No effective means for *wielding* floating batteries, when large enough to be formidable, had ever been discovered previous to the discovery by Robert Fulton of that development of steam power applicable to ships and all other floating structures. With regard to the ten great floating batteries, especially constructed for the memorable siege against Gibraltar, it is obvious to every man of military mind that, however formidable such batteries might have been, even without towboats, or steam power in any other form, employed in the *defence* of a high rock fort like that of Gibraltar, such floating batteries could never be relied on as effective *means of attack* upon a high rock fort of that description, as the immense *strength of the position and of the work*, with the great *elevation* of the cannon of the work attacked, would insure the destruction of floating batteries, or render an attack by them unavailing. It is a well ascertained fact, however, not generally known, as but few historians have noticed it, that the floating batteries employed in the siege of Gibraltar were manned principally with *convicts*. This fact may be considered as the most conclusive among the principal causes of their failure, as well as of the opinion entertained and expressed by the French and Spanish commanders, that most of these batteries were set on fire by the men on board, whose duty it was to defend them. Be this as it may, a minute examination of the *military history* of the terrible siege of Gibraltar is respectfully referred to by your memorialist as evidence in favor of his proposition for the immediate construction of floating batteries for the *defence* of our ports and harbors; inasmuch as it is obvious that, if the commander of Gibraltar had been supplied with ten floating batteries, such as are here proposed, with our present means of towboats, with steam power to wield them, he would have destroyed the whole of the combined fleets employed against him, or at least have kept them out of the bay or harbor of Gibraltar. To the siege of Gibraltar and the attack on Copenhagen, two of the most terrible and extraordinary events known to modern history, in reference to the *attack and defence of seaports*, an event known to your memorialist and many other officers now in service will be added, to show the utter impracticability of locking up a navigable river or inlet, or of arresting the movement of a fleet thereon, by fortifications with cannon placed on the banks of such river or inlet. On the night of the 6th of November, 1813, the flotilla, under the command of Major General Wilkinson, consisting of nearly 300 boats, sloops, and schooners, passed the fort of Prescott, upon the Canada side of the river St. Lawrence, under a constant fire of the cannon of the fort, manned by the best of British artillerists, without the loss of a boat or other vessel, and with the loss of but one man killed and two wounded; notwithstanding the flotilla was nearly one hour in the act of passing the fort, during the whole of which time the fire of the enemy's cannon was incessant, and the line formed by the flotilla in its movement was deemed to be within pointblank shot of the fort—say from 600 to 800 yards' distance! This fact was proven by the whistling of the enemy's shot, many, probably hundreds, of which passed apparently from 20 to 50 feet above our heads, while on board the boats in their slow passage, for they were propelled by oars, upon a gentle current, which enabled us to move at the rate of not more than three miles an hour. This movement was effected in the night, tolerably clear, but without moonlight. With the history of these three events before us, it would seem to be the height of imprudence in us to persevere in the construction of

costly forts, with the vain hope of protecting our seaports against fleets propelled by steam power, without the employment of floating batteries, such as are here recommended, with railroads to sustain them by timely re-enforcements.

5. But it has been contended by men of high pretensions in theory, if not in the practical science of war, that, in place of the floating batteries here proposed as means of *harbor defence*, we should direct our attention mainly to the construction of *steamships of war*. In reply to this theoretical suggestion, it is only necessary to say that we must, indeed, ultimately have *steamships of war*, or we must give up the whole of our foreign commerce; but, if we desire to preserve our seaports and commercial emporiums, we *must* have for their protection *floating batteries*, which constitute, in the present state of the arts, the natural link in the great chain of national defence between the land and naval means of service: and, as these floating batteries are not designed for going to sea, (excepting near our ports and harbors, in calm weather,) they properly belong to the land service. The fact that our seaports are rendered more than ever liable to sudden and unlooked-for attacks by fleets propelled by steam power, renders it all-important to their security that our means of harbor defence should never, even for a single day, be left exposed to an assault, when that assault may, in all human probability, result in the destruction of one of our most vital points of military and commercial operations. If, however, steamships of war should be preferred to the proposed floating batteries, a solemn act of Congress should be passed, forbidding any officer from removing them beyond the immediate vicinity of the harbor to which they may be assigned; as it must be obvious that our seaports cannot be protected without every requisite means of protection is held ready for action within our harbors, repectively. The floating batteries, it is believed, will cost but little more than the timber, iron, copper, and other materials for their construction, if they are built, as they should be, by the troops intended to defend them, aided by some ship-carpenters to give them tight bottoms.

6. With three to five of the proposed floating batteries placed in the form of a crescent across the Mississippi river, with the concave side of the crescent down the river, and this curved line of floating batteries flanked by a small temporary fort on each bank of the river, so as to bring the cannon of each fort or battery to bear on any fleet or vessel *ascending the river from the sea*, we should be certain thus to give each of the enemy's leading vessels *a double cross-fire*; raking them in front and on each side at one and the same time, with several of our heavy guns from each one of our floating batteries and adjacent forts, *with red-hot shot*—a description of defence which would to a certainty, in 99 cases out of 100, be fatal to any fleet that could possibly be brought against our line of batteries. But, "to make assurance doubly sure," we could have our floating batteries occasionally connected together by *chain cables* and *chevaux-de-frise* which might sometimes bring us in close contact with a daring foe, as Nelson or our own Decatur and Perry were in the mode of attack which characterized those chivalric naval commanders. But the contact thus produced would insure to us the moral and physical effect of our efforts being in *self-defence*, with the superior strength of our *batteries, bulwarks*, and *weight of metal*—advantages which we should enjoy from the moment the invading foe comes within the range of our long and heavy cannon, until he finds himself entangled in, and arrested by, our *chevaux-de-frise*, where the contact would be so close as to enable us to throw into his ships *hand grenades* and *incendiary shells*, with an occasional supply of heated steam; while our own batteries would be preserved from a similar annoyance by their superior width, strength, and peculiar structure of their upper works, which are proposed to be secured by sheet-iron of immense thickness; a description of work which it is believed could not be so effectually applied to vessels of anything like the ordinary model of ships-of-war designed for sea service.

But again: "to make assurance doubly sure," we should not risk such places as New York and New Orleans—by far the most vital, and in a civil and (the latter more especially) in a military point of view, the most important seaports in America—without at least two curved lines of defence—one at or near the entrance of the harbor, and the other at the next narrow, strong, interior point, fortified as above suggested, with the curved line of floating batteries flanked by a fort on each side of the river or channel; for example, for the harbor of New York, *the Narrows;* and for the Mississippi, *Forts Jackson* and *St. Philip.*

7. Floating batteries, such as are here proposed, constitute the only effective means of defence against fleets propelled by steam power, in a nation situated as the United States are, covering a large extent of country, bordered by a seaboard of near 4,000 miles in extent, indented by many fine seaports, with great cities filled with the wealth of a lucrative commerce with every quarter of the globe, together with our own agricultural products, fully capable of sustaining our expansive commerce, until it surpasses that of any other part of the globe: provided we take care to maintain an attitude of honest defiance towards the licensed as well as the unlicensed pirates of every quarter of the world, by which they will clearly understand that we desire to be at peace, to do equal and impartial justice to all nations, and to engage in entangling alliances with none; and above all, if we are attacked,we should be prepared speedily to concentrate at the point of attack sufficient force and supplies to overwhelm the invader with irretrievable defeat before he will have it in his power to destroy any of our means of defence, or our seaport towns. Our lawless neighbors will thus be taught that if they attack us they do it at their peril, and at the risk of leaving their armies to enrich our plantations.

8. So much for their uses in a state of war; then, on the return of peace, when the most expensive fixed fortifications are absolutely useless, and, moreover, a heavy burden to the country to keep them in repair, floating batteries will be usefully employed as barracks and hospitals, and in deepening the channels, liable to be filled up by clay, and loam, and sand, as those at the mouth of the Mississippi river are often filled up. As floating barracks and hospitals, the proposed batteries would be of essential benefit to the service everywhere, inasmuch as the outlets of our rivers and seaports are generally healthy positions; and they will form the most appropriate asylums for our convalescent or slightly disabled soldiers or seamen, most of whom will render essential service in preparing fixed ammunition, and in the instruction of the young and inexperienced, and in holding them ready for action. Above all, in a state of peace the proposed floating batteries will be of immense utility to the service for all purposes of military schools, to which the aspiring youth of our country of the community will gladly repair, for the attainment of military knowledge, where it can be acquired both in *theory* and in *practice,* and where its study and practice will be rendered most delightful and praiseworthy by the simple process of the students rendering immediate and important public service in return for the public instruction received by them. The military education of our youth should commence at the age of sixteen, and be completed at the age of twenty-one or twenty-two. If our youth are educated upon floating batteries at the entrace of our harbors near the Balize, Sandy Hook, or the Narrows; otherwise, if the youth of each Atlantic or southern State are educated at the entrance of the principal seaport of such State, the graduate, after finishing his education, would have the proud satisfaction of exhibiting to his parents or guardian, on his return home, the gratifying evidence of his having performed five years' honorable service, while acquiring attainments qualifying him for a high, perhaps the highest, command in the army; attainments, too, tending to qualify him in no small degree for the highest stations recognized by the free institutions of our country, and exonerating him for ever after from any other than mere voluntary service.

9. Shall we be told by the advocates of our *obsolete* systems of national de-

fence that the risk of health and comfort is too great to have the youth of our country educated upon our floating batteries at the entrance of our harbors, or at the mouths of our rivers, where the swell of the sea and the turbid waters of our overflowing Mississippi and other rivers may too sensibly affect the nerves and disturb the meditations of the students on whom the defence and fate of the republic must soon depend? Will our opponents point to the United States Military Academy, and contend that the graduates of that institution are the better for the serene stillness, quiet, and comfort of the interior position of that institution? We may answer, no! no! The only great defect to be found in that institution consists in the *quiet* and *almost exclusively sedentary mode of living* which has long marked the character of that otherwise admirable institution; a mode of living which contributes too much to sacrifice the vigor of constitution necessary to a real hard-duty soldier, to the attainment of that literature and science, with the social habits and enjoyments more befitting a country gentleman of affluent fortune, than a thoroughbred soldier, statesman, or man of business:

> "The life of fame is ACTION understood;
> That action must be virtuous, great, and good."

Habits of action, of mind and body, should be formed in childhood, or at least before the seal of manhood is fixed upon the student. Why is the seaman placed on duty on board the ship-of-war at the age of twelve to sixteen, and required to perform his practical labors from the moment he takes his first lessons in the theoretical duties of his profession? It is to facilitate his attainments of both in the shortest possible time, and to the greatest possible extent of perfection. His health and habits are perfected *upon the precise element*, and *in exposures to the climates and weather*, to which his duties will call him, and often confine him during a state of war. Why is the law student required to attend the courts, and the medical student the hospitals, while attending to the theory of the profession? It is because, even in these learned professions, where much more depends upon books, or theory, than in the profession of arms, all experienced men unite in the opinion that great benefit to the student results from combining practice with theory. The watchmaker, shoemaker, carpenter, and blacksmith, always put their students or apprentices to work at the earliest possible period of their instruction; often, indeed, before they are able to wield many of the tools of their trade. With these facts before our eyes, added to the custom which has obtained in many of the enlightened States of Europe, and which we are apparently disposed to rivet upon our own land of freedom and invention, it would seem impossible to resist the conviction that the science of war is indeed in its infancy. Of all the sciences and arts, there are none where the *union of theory and practice*, in all the duties of *preparation* for the great dernier results, are so much altogether necessary and proper, as in the science of war and the duties of an army; and yet, wonderful to tell, there is no trade or profession, reduced to separate and distinct rules of science and art, in which *theory* is so much relied on, or *practice* so much neglected, as in the art of war, as it regards military operations on land, or in the attack and defence of seaports.

ART. II. So much for *floating batteries*, and their uses in peace and in war. Let us now proceed to consider the all-important kindred measure of railroads, for co-operating with the proposed floating batteries, and perfecting the promised system of national defence.

10. We propose the immediate location and construction of seven railroads, to extend from the two central States of Tennessee and Kentucky to the seven grand divisions of the national frontier, as suggested by a plan embraced in the accompanying diagram, viz:

First One principal railroad from Lexington, Kentucky, to Buffalo or Plattsburg, New York, with branches to Detroit, Albany, and Boston.

Second. One principal railroad from Knoxville, Tennessee, to Norfork, Virginia, or Baltimore, Maryland, with branches to Richmond, Virginia, and Newbern, North Carolina.

Third. One principal railroad from Memphis, Tennessee, to Charleston, South Carolina, or Savannah, Georgia, with branches to Milledgeville, Georgia, and East Florida.

Fourth. One principal railroad from Louisville, Kentucky, to Mobile, Alabama, with a branch to Pensacola, Florida.

Fifth. One principal railroad from Lexington, Kentucky, *via* Nashville, to New Orleans.

Sixth. One principal railroad from Memphis, Tennessee, to the Sabine ridge, with branches to Fort Towson and Fort Gibson, Arkansas.

Seventh. One principal railroad from Louisville, Kentucky, or Albany, Indiana, to St. Louis, Missouri, and thence to the Misouri river, north of the mouth of the Big Platte; with branches from Albany, Indiana, to Chicago, and from the northwest angle of the State of Missouri to the upper crossing of the river Des Moines.

11. These seven great arteries or principal railroads here enumerated will each be from 500 to 700 miles in length, (averaging 600 miles,) making altogether a distance of 4,200 miles; and the average cost of locating and constructing them is estimated at $15,000 per mile; amounting, altogether, to the sum of $64,000,000, provided they are located and constructed by the army of the United States—the railroads to be of the most substantial kind, each having a double track. The whole work to be completed by the authority and at the expense of the United States; provided that, on its final completion, it shall revert to the States, in their sovereign and individual capacity; each State to retain forever the right of property in and to all of such section or sections of the said railroads, with all their appurtenances, lying or being within the territorial limits of such States, respectively, upon the simple condition that all troops, whether regulars or volunteers, in the service of the United States, with their munitions of war, together with the mail, shall be transported forever upon these railroads free of expense to the United States.

12. Without attempting to enumerate all the benefits to be derived from the proposed railroads in peace as well as in war—benefits which are for the most part too generally known to require any particular notice here, (and others, certainly of very great value, can only be conjectured, inasmuch as they are to some extent *invisible*, and to be developed, principally, it is believed, by the excavations necessary to complete the graduation of the basis of the work through the vast regions of *mineral wealth* over which its various lines will extend, where accident has hitherto led to the discovery of a sprinkling of gold, with millions of acres of the richest iron and lead ore and coal, together with copper and other valuable minerals,) your memorialist will here concisely advert to the principal benefits which the military aspect of the proposed work promises, and conclude with a notice of such advantages as must immediately result to the *army, to the several States*, and the UNION, from the organization and employment of the national regulars and volunteers as operatives upon the work.

13. *The principal advantages to be derived from the proposed railroads in a military point of view.*

In a state of war they will enable us to transport the military men and munitions of war of the two central States of the Union, and of all the interior districts of the twenty-four border States, to the seven grand divisions of the

national frontier, without animal power, in one-tenth part of the time, and at one-tenth part of the expense that the movement would cost in the present state of our bad roads. The proposed railroads would thus enable us to obtain more useful service in war from ten thousand men, by the increased rapidity and safety of their movement to the point of attack chosen by the invading foe, than without railroads we could obtain from an army of one hundred thousand men marched upon our common roads; as, in addition to the saving of *time*, which in war is *power*, and *health*, and *life*, and *money*, we shall save our citizen soldiers from what they usually deem the most irksome and insupportable afflictions and privations attending their tours of military service; we shall save them from long and tedious marches, and from the still more trying scenes of a long-continued delay in camp, and the consequent painful separation from wife, children, friends and business. On the contrary, after being assembled and prepared for action, we shall *fly* to meet the invading foe at the rate of 250 to 300 miles in 24 hours—taking with us every desirable necessary of life for the preservation of health, activity, and personal prowess, so that when we meet the enemy we shall enjoy every desirable advantage in every conflict, in most of which we cannot but be successful; and in place of the usual campaign of three, six, or twelve months of distressing service, we may reasonably calculate on being conveyed, with every desirable supply from the central States to the frontier, in the short space of fifty or sixty hours' time, and of meeting and beating the invading foe, and returning to our homes in a few days, or at most a few weeks more. Hence the great utility of the proposed railroads in a state of war; and then, on the return of peace, when our sixty millions of dollars worth of fortifications, and armories, and arsenals, and ships-of-war, are worse than useless for any of the purposes of peace, and a great and constant expense to repair and replenish them in order to hold them ready for another war; then our railroads, taking, as they must take, precisely the direction that the commerce of our country takes, from the seaboard to the central western States, will, when turned to commercial purposes, produce a revenue to the States that own them that will be more than sufficient to replace, in seven years' time, every dollar expended in their construction, and forever thereafter produce a revenue sufficient for the support of all the State governments, and to pay for the education of every orphan child in America. The proposed railroads will do more—they will form ligaments of union more powerful than bulwarks of adamant, or chains of iron or gold, to bind the States together in perpetual union. In designating the military men of the central States of Tennessee and Kentucky as the disposable force of the nation, we have reference to the fact that this force is rendered disposable by the central position of these two States —they having no frontier to defend; while the forces of all the other twenty-four States are rendered local forces, and not disposable, by reason of their being all border States—the boundary of each extending to the frontier: and, therefore, having no frontier of their own to defend, they are thus rendered local, not disposable.

14. *Organization of the regular forces and operatives to be intrusted with the location and construction of the work.*

One major general; one adjutant general, with seven assistants; two brigadier generals; seven surgeons, with twenty-eight assistant surgeons; and twenty-eight chief artificers or scientific mechanics; seven regiments, each regiment to consist of one colonel, two lieutenant colonels, four majors, one adjutant, and one quartermaster, two sergeant majors, and two quartermaster sergeants, with ten companies: each company to consist of one captain, two first lieutenants, two second lieutenants and two cadets, with one quartermaster sergeant, one orderly sergeant, four sergeants, four corporals, two musicians, ten artificers, and eighty private soldiers. The general, field, and staff officers, with the captains and first lieutenants, to be taken from the officers of the engineers, topographical

engineers, artillery, and infantry now in service; officers of established reputation for professional talents, experience, industry, economy, and exemplary habits, and to have the pay and emoluments of mounted dragoons, with 50 per cent. additional pay, while actually employed as engineers, superintendents, or operatives, upon the location or construction of the work.

15. *Location of the proposed railroads.*

The location must embrace the *nearest and best routes*, commencing within the two central States of Tennessee and Kentucky, and extending to the seven grand divisions of the seaboard and northern frontier, as above suggested; to be ascertained, particularly through the mountainous regions, by a series of topographical surveys, and finally decided on and established by a board to consist of a general and four to six field officers, upon whose decision the major general commanding upon this service should have power to act: to approve or disapprove the decision of the board, upon the same principles that the President is authorized by the Constitution of the United States to approve or disapprove an act of Congress.

These surveys will produce an immense mass of mineral, geological, and topographical information, of great value to the States and the Union, and of indispensable utility to every member of the army and militia of the nation who aspires to that employment in the national defence which leads to the true fame of a citizen soldier—information tending to develop the military and physical resources of every State and district preparatory to a state of war, and of essential benefit to the people of every class during a state of peace.

16. *Operations in the final construction of the work.*

Each one of the proposed routes to be placed in charge of a colonel, who will superintend the construction of the work; and for the prompt and convenient accomplishment of every part of the work, each route will be subdivided into *ten sections*, and each section placed under the immediate superintendence of a captain, to be assisted by the whole of the subaltern officers, non-commissioned officers, artificers, and privates of the company, with as many volunteer artificers and other operatives as will be sufficient to insure the completion of each section in from four to five years after the location of the work, which may be accomplished in one year; so that when one section of sixty miles in extent is completed, the whole work will be quite or nearly finished, with the exception of that which is unavoidably located over a mountainous country. The completion of the mountainous sections may be hastened by such increased means as the exigencies of the service shall demand. The simple process of carrying on such a work necessarily increases the *means* and *facilities* of its progress and speedy accomplishment. Thousands of our young men, ignorant of every operation upon the work, will soon become able operatives. To the regular army we should have the power to add every scientific *mechanic, artificer*, and *able-bodied willing laborer*, to be employed as *volunteers*, principally within the limits of the States where the sections of the railroads on which they are to be employed, respectively, are located and constructed, so that the services of all may be near their places of residence. We shall thus call into action and usefulness that class of American genius which would otherwise, to a great extent, languish and fall into the whirlpools of vice or imbecility for want of employment and judicious direction—that genius which is found in the learned professions, in all the walks of fashionable life, in the pursuits of agriculture, commerce, and the mechanic arts, as well as in the haunts of dissipation and idleness; whose votaries may indeed often too truly say, "We are idle because no man hath given us employment." By these idlers, whose employment would save them from misery and ruin, and render them valuable citizens, and enable them to render their country invulnerable in war and enrich it in peace—aided by the enterprising young men which every section of the republic is capable of affording for the proposed great work, and arming with the irresistible weapons of

industry and enterprise necessary to enable them, in obedience to the sublime mandate of Holy Writ, "to replenish the earth and subdue it," and render it fruitful, that it may multiply the benefits and blessings which it is capable of yielding to man—the proposed work will be speedily accomplished.

17. The hidden wealth which the progress of the work will disclose, added to the vast supplies of materials for construction, for transportation, and for food and raiment for the operatives upon the work, and for commerce—supplies, a considerable part of which every year waste away among the interior sections of the western and middle States for want of a cheap conveyance to good markets, such as the proposed railroad will afford—will contribute much towards the completion and final profitable employment of the work; supplies that would every year be augmented by new improvements and by encouraged industry, until they would far surpass the immediate wants of the great and increasing influx of population and operatives upon the public works and frontier; and, on the completion of the work, these constantly increasing supplies would be poured into the improved channels of cheap transportation and profitable commerce, gradually swelling the profits of both, as the millions of tributary rills and rivulets expand the mighty river into whose bosom they pour their liquid treasures. It is believed, moreover, that the construction of the proposed railroad through the southern, western, and Atlantic States would not fail to create the means for the speedy completion of all the lateral branches required for every State and seaport, by multiplying among us experienced engineers and scientific mechanics, with habits of industry and enterprise; giving to all classes of the community profitable employment, calculated to render them independent in their domestic affairs, respectable and happy in peace, and formidable in war, while the money expended would be kept in a healthful state of circulation among the farmers, merchants, and mechanics of our interior settlements, in place of its being carried off to enrich foreign merchants, or to form every year at home a new bone of contention between the votaries of the spirit of party, such as go all lengths for party men, regardless of the true interests and honor of the republic. And when, during a state of war with nations surpassing us in naval strength, we find ourselves compelled to abandon the ocean, and be deprived of our foreign commerce—the inevitable consequence of a war with any of the strong powers of Europe, without first supplying ourselves with a fleet of steamships of war, as well as floating batteries and the proposed railroads—these roads, even while occasionally employed in the transportation of troops from the central States to the south, will take return cargoes of southern products, such as sugar, cotton, oranges, and lemons, from the southern to the middle and northern States, from whence they will bring return cargoes of the numerous products and manufactured articles of the northern and central States needed in the south—an interior commercial intercourse by which the privations of our foreign commerce would be remedied, and many of the evils of war removed, and all others greatly mitigated. Indeed, the completion of the proposed railroads and floating batteries your memorialist believes would soon effectually prevent the recurrence of war, so long as the United States shall see fit to confine their views and national policy to the *magnanimous principle* of defensive war; as the proposed means of national defence would give a degree of available strength, both physical and moral, that would render the peril of an attack a perpetual source of terror to our evil-disposed neighbors, and consequently *moral strength and security* to our beloved country.

18. It is proper *in a state of peace to prepare for war*. The wisest statesmen in all civilized nations have acted upon the principle here suggested. It is time for us to inquire what would be the consequence of our receiving the unexpected visit of a large fleet of steamships, armed as the French fleet lately in the harbor of Vera Cruz were, bringing in the mouths of their cannon an unexpected declaration of war. Much as we may rely on the unsurpassed chivalry of

our volunteer corps, such a visit could not but be attended with incalculable mischief, without the means of defence here proposed—means of defence which will enable us to march by land from Tennessee and Kentucky to Buffalo, New York, Philadelphia, Baltimore, Norfolk, Charleston, Savannah, St. Augustine, Pensacola, Mobile, New Orleans, or Texas, from 200,000 to 500,000 men in the short period of three days' time! This rapid movement would have been very desirable, as it would have saved millions of money and thousands of valuable lives in our former wars, and would have been very essential to our security against a land and naval attack when we had no reason to apprehend an invasion by fleets propelled by steam power. But now that we know many of the most warlike nations of Europe are busily occupied in the work of preparing steam-ships of war, we have no longer a choice in the issue whether we *must* or *must not* prepare the means here proposed for defence against the improved elements of destruction which we know our neighbors hold in readiness to employ against us. We must lay aside our old obsolete military books of the last century, such as we have borrowed from England and France, and we must profit by the lights by which the present age, the present year is illuminated, and prepare to defend ourselves by the agency of this mighty power, by which the invading foe will inevitably attack us.

19. Ancient and modern history is replete with evidences of the wisest of governments having promptly availed themselves of the use of every description of *weapon* deemed to be most formidable in war, as well as of every kind of *power* applicable to the purposes of rapidly wielding armies and munitions of war, as soon as practicable after their discovery. We need only advert here to some few discoveries which, trifling as the first and third may seem, were deemed sufficient at the time of their discovery to merit the attention of men and monarchs of profound wisdom and genius.

1st. When the commanders of the armies of King David reported to that veteran monarch that they had sustained heavy losses in their operations against the Philistines, in consequence of their having employed in battle the bow and arrow, David promptly gave orders to his commanders to avail themselves of the discovery of this then formidable weapon, and make themselves and their men acquainted with the use of it, "so as to place them on an equal footing with their enemy."—(See the "History of the Bible.")

2d. When in the fourteenth century an obscure monk of Germany discovered gunpowder, with some of its uses in war, all the other nations of Europe that were blessed with wise rulers hastened to avail themselves of the discovery—a discovery which ere long induced all the civilized world to change their unwieldly weapons of war for fire-arms; gradually laying aside their war chariots armed with scythes, their battering-rams, with their coat of mail, and most of their personal armor.

3d. The use of wheel carriages on improved roads added more than twenty-five per cent. to the efficiency of an army, by enabling it to march one-fourth further in a given time, and by carrying with it a more ample supply of artillery, ammunition, and subsistence, prolonging the period of active operations, and occasionally taking the enemy by surprise, as, by the increased celerity of his movements, Napoleon took the enemies of France by surprise in his first campaign into Italy.

4th. All civilized nations speedily availed themselves of the discovery of the magnetic needle, with the inventions and improvements in ship-building, the use of sails, &c. Many of the discoveries here alluded to, however, though they contributed to facilitate the movement of troops and munitions of war, excited little or no interest at the time of their discovery compared with that of the application of steam power to ships and other vessels, and to vehicles of land transportion on railroads. In these last discoveries we may well be allowed to speak in the language of poetry, and say that—

"Steam power was almighty in its birth;"

while gunpowder, fire-arms, wheel carriages, and all former improvements in marine structures, though partially known and in use for centuries past, have exhibited little or nothing beyond their now apparent state of infancy until within the last and present century. Even now no civilized nation can boast of any discovery or improvement in fire-arms, gun-carriages, or in naval architecture in anywise calculated to be of any *peculiar advantage* to any one nation over another nation; while these developments of steam, with floating batteries and railroads, are calculated to render a nation, in the position which we occupy, at least ten times more formidable in a *war of self-defence* than in *an offensive war* against nations of equal numerical strength, and provided with the means here proposed. All the discoveries above referred to in the science of war have, however, contributed much to ameliorate the condition of nations and of armies in their conflicts and controversies, and greatly to lessen the evils of war. The greater the improvement in this awful and sublime science, the less calamitous and the more humane have been the results of military operations, wherever the contending parties were equally acquainted with the progressive improvements, and had equal or nearly equal means of profiting by them. If these propositions are correct, (and history proves them to be strictly true,) where, it may be asked, where must our improvements in the science of war, dependent on steam power, terminate? The wise and the good who have long cherished the prospect of a blessed *millenium* will readily answer the question.

20. Your memorialist had long cherished the hope that some patriotic statesman of military mind would be found at the head of the War Department, able and willing to bring the subject of his system of national defence before the President of the United States and the national legislature; and in this hope he has freely and frankly submitted to several of the heads of that department his views upon the subject at different periods during nearly seventeen years past, until he received from Mr. Secretary Cass the most irrefragable evidence that the official communications and reports of your memorialist were either misunderstood, disregarded, or disapproved. Nevertheless, assured as he has constantly been of the practicability, propriety, and necessity of such a system of national defence, and deeming it to be a matter of *discovery, invention,* and *improvement* in the art of war, which should be discussed with the same freedom as any other discovery in the useful arts, your memorialist, as the author and inventor of the proposed system, has addressed himself freely to private as well as public men of several different nations and of all parties, and has received in return, from men of the highest attainments and unimpeached and unimpeachable patriotism, full and cordial concurrence in his every view hitherto presented in favor of his system of national defence here set forth and explained. Far from being discouraged at the opposition of three honorable Secretaries for ten years in succession, he has learned from that opposition that the War Department of the United States republic is rather a theatre of *executive action* upon political matters *already settled, enacted,* or *ordered,* than upon *new discoveries, inventions, or improvements in any branch of the art of war.* He could not but persevere, therefore, in his humble efforts to render his country some good service *in peace,* as he had done *in war;* convinced as he is that his system soars above the pestilential atmosphere of the *evil spirit of party,* as it is a system of national defence designed to impart benefits and diffuse blessings alike throughout every State and Territory of the republic and upon all parties.

The oath of office taken by your memorialist, requiring him to serve the *United States, (not a party,)* requires him to act and speak in accordance with the rules and articles of war. He has always held himself ready to *risk his life, his bread,* and *his fortune,* for his country; and he has the happiness of knowing that he has risked his life for her often—hundreds of times. His oath of office does not restrain him from speaking frankly and truly in the vindication

of his motives, his conduct, his honor, and his system of national defence. To withhold his views upon an occasion of this kind, indeed, would be virtually a violation of his oath of office, which requires him, *as a primary duty, to serve the United States honestly and faithfully against their enemies or opposers whomsoever;* and he could not conscientiously comply with this oath, without submitting to the national legislature every section and every paragraph contained in this memorial. He feels conscious that he is right. His enemies will not hesitate to admit that he is either *right* or *wrong*. If any member of the national legislature believes him to be wrong, he entreats that member to institute any, the most rigid, scrutiny into the whole of the views here presented by your memorialist. He thus respectfully solicits his friends, and fearlessly challenges his enemies, to put him in the wrong, by proving his system of national defence to be either unnecessary or impracticable. But if he is deemed to be right in the foregoing views, showing that his system is indispensably necessary, and that its accomplishment is practicable, at the expense and within the period of time here suggested, surely no time should be lost in carrying into execution this system of national defence. As it regards the treatment he has received from the last three heads of the department of war, personally, he has nothing to say; having, ever since he entered the public service, acted upon the principle that

> "The real patriot bears his private wrongs
> Rather than right them at the public cost."

Your memorialist desires no greater triumph over his *weak* or *wicked* calumniators, nor any other atonement for past injuries, than the triumph of truth that must result from a full and perfect examination of his past life and services; and more especially *a critical comparative review of his services in Canada (approved by a Madison)—and his services in Florida (condemned by a Jackson)—and more especially of* his system of national defence, approved by *a Seward, a Cannon, a White, and a Lumpkin*, compared with the services and system of the *party men* opposed to your memorialist.

21. The discovery, by Oliver Evans, of that development of steam power by which the locomotive and other vehicles of land transportation are propelled upon the railroad, and by which the movement of large armies, which may be hastened from twenty-six miles, (the day's march of Napoleon,) to three hundred miles in one day; and the discovery, by Robert Fulton, of that kindred development of steam power, by which our rivers and lakes have been covered with floating palaces and warehouses, surpassing in the velocity of their movement anything before seen upon our waters—making an easy conquest of the previously unsubdued current of the mighty Mississippi, and now proudly encountering in triumph the mountain wave of ocean; as these discoveries were the result of previously known developments of steam power, in its application to mill and other labor-saving machinery, suggesting to Evans and Fulton the great *principle* upon which their success was known to depend; so it must be obvious to every man of military mind, and to every scientific mechanic, that the discoveries of these two great public benefactors must necessarily form the basis of the system of national defence which your memorialist here offers to Congress. Oliver Evans and Robert Fulton were, until a few years before their death, denounced by thousands of *learned theorists* as *eccentric visionary* men. The same class of censors have honored your memorialist with similar epithets. He has had the satisfaction, however, to learn from some of those who thus denounced him that they have since seen their error, and are now among the true believers in the feasibility, value, and importance of his system. He adverts to this fact, here, only to justify or excuse what he deems it to be his duty to say in his own vindication, and in reference to his own past public services; because

he can refer to no historical work or biographical memoir containing any account of his public services in the war of 1814, excepting such as have been distorted by malignity or by ignorance. He is therefore constrained to say, as an act of justice to himself, that he is the only general officer now living, who, as commander-in-chief of a division, or separate army, or detached corps, ever achieved a victory over any British army, upon any part of the Niagara frontier, in the war of 1814; that he had the good fortune to command the division from which his beloved Major General (Brown) had been taken, by reason of a severe wound, on that frontier, in August, 1814, during twenty-three days of which time your memorialist was actively engaged in battle, and in a brisk cannonade and bombardment, and other severe conflicts with the British army under Lieutenant General Drummond. In the principal battle, the lieutenant general acknowledged a loss of nine hundred and five officers and men killed, wounded, and missing, with a similar loss of nearly *six hundred* in the several other conflicts. During twenty-two days of the time, there were but few hours, from daylight in the morning until dark in the evening, in which the British cannon shot and shells did not present to your memorialist the most instructive exhibition of every variety of *effect* of which a well-directed cannonade and bombardment upon a very slightly and partially fortified camp, of which an unfinished bastion and block-house formed the only tolerably fortified angle, could possibly present. In that long conflict—in which the British forces were reported to amount to 4,200, principally regulars, and the United States forces to 2,500, near one-fourth of which were New York and Pennsylvania volunteers under General Peter B. Porter—your memorialist is convinced he had a better opportunity than any other general officer of the United States army ever had during the war of being thoroughly acquainted with the effect of the enemy's *shells* and *cannon shot* upon our stone-masonry, earthen traverses, embankments, or breastworks. He had previously witnessed at Fort Meigs, and on the river St. Lawrence, as well as upon Lake Erie, in the British and United States ships-of-war, three days after Perry's glorious triumph, the effect of the enemy's and our own cannon shot upon block-houses, ships-of-war, and other vessels, as well as on other means of defence. The investigation of these results of some of the most important conflicts between the United States and British troops, in the war of 1813 and 1814, added to a careful attention to the theory and practice of gunnery for several years prior to the war, with much attention to the subject since, warrants your memorialist in speaking somewhat confidently, as he has, upon the various bearings and tendencies of cannon shot and shells on floating batteries, steamships of war, forts, and other means of attack and defence of seaports; and of railroads for the prompt movement of re-enforcements, as embraced in his system of national defence here set forth and explained. For further particulars in reference to the various conflicts referred to in this article, your memorialist respectfully refers to the officers whom he had the honor to command in those conflicts: among the most meritorious of whom are Paymaster General Towson and Adjutant General Jones, now on duty at Washington city. The names of all others will be found by referring to the adjutant general's office. And to show in what estimation his conduct was held by the Executive and national legislature, your memorialist takes leave to refer to the joint resolution of December, 1814, by which he and the officers and men of his command were honored with a vote of thanks, and the President authorized to present to him a gold medal. He received also from the legislatures of the great and patriotic States of New York, Virginia, and Tennessee, similar resolutions of thanks, and from each a gold-hilted sword of honor. With these magnificent tokens of high approbation of his conduct, your memorialist could not but feel himself in honor and in duty bound to exert his best faculties to *serve his country faithfully in war and in peace.* With these impressions, he respectfully offers to Congress his present system of national defence.

22. Your memorialist is convinced that the proposed means of protection constitute the first and only discovery known to man, whereby a nation situated as we are, and acting upon the magnanimous principle of *self-defence*, can, without any doubt, at a moderate expense, and by means that will in a few years of peace repay all the expense of the work, hold in their own hands, forever, the incontestable issue of any possible *war* upon her seaboard or domain, waged by any nation, or by any such combination of empires or kingdoms as have once dared to assume the appellation of "*holy alliance;*" and that any nation of our numerical strength and military resources availing herself of the discovery, may, if she be just and true to herself, safely assume the attitude of honest defiance towards the armies of Europe, if not of every quarter of the globe: while the most warlike nations, neglecting the use of steam power, with railroads and floating batteries, will be found wholly unable to maintain their independence. In this view of the subject, it presses itself upon our attention not as a matter of choice, but as a work of absolute necessity—*as a measure of self-preservation.*

23. The *constitutionality* of the proposed system of national defence would be left untouched by your memorialist, but for the veneration he entertains for that sublime and sacred instrument bequeathed to us by our fathers of the revolution, added to the oath he has taken to support that inestimable charter of our free institutions. He would not willingly be deemed capable of urging or soliciting the adoption of any measure not in accordance with the Constitution of the United States; and having, in common with each one of his fellow-citizens, an indubitable right to judge for himself upon all questions arising upon the different provisions of that most perfect charter of human freedom and self-government, without confiding too much in the opinions of statesmen laboring under the despotic influence of *party* discipline—a despotism ever operating upon the hopes and fears of all who tamely submit to the *tyranny* of such a discipline—the views which follow are respectfully submitted. The 8th section of the 1st article of the Constitution of the United States authorizes Congress to "*declare war*," and "to raise and support armies," and "to provide for calling forth the militia to execute the laws of the Union, to suppress insurrections, and repel invasions;" and also "to provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States, respectively, the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress."

Inasmuch as these important provisions of the Constitution cannot be carried into effect without roads, and the effective defence of the republic *is a work upon which our national existence depends*, the transcendent importance of this work calls aloud for the very best roads; and railroads being immeasurably the best for all military purposes, they are deemed to be as fully authorized by the Constitution of the United States as the best of rifles, or the best of cannon, or gunpowder, or flints, or forts, are authorized, as will be seen by the last paragraph of the above-mentioned 8th section of the Constitution, which, after particularizing the specific powers granted to Congress, as enumerated in that section, concludes with the words which follow: "To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, vested by this Constitution in the government of the United States, or in any department or officer thereof."

A wise people, with the experience which the framers of the federal Constitution had acquired in the triumphant revolutionary conflicts through which they had then recently passed, could never have authorized a declaration of war "to repel invasion," without making provision for the best of means for insuring a successful and glorious termination of the war: that provision was accordingly made in the above recited authority given to Congress, to make all laws which shall be necessary and proper for carrying into execution "the fore-

going powers, vested by this Constitution in the government of the United States, or in any department or officer thereof." By this comprehensive grant of power the national legislature has passed laws for supplying the land and naval forces with many things not expressly named in the Constitution. Hundreds of military roads have been made by the troops and otherwise at the expense of the United States; first, for the purpose of facilitating the march of the troops to and from the places of their destination, at the rate of twenty to twenty-six miles a day, when, without such roads, they could not have marched a quarter of the distance without leaving behind them their cannon and baggage-train; and, secondly, for the use of the constantly-moving families and other travellers to the continually-expanding border of the republic, by which simple process thirteen new States and near thirteen millions of inhabitants have been added to the *old thirteen States* of the revolution in the last sixty years. Who ever pronounced these miserable roads to be unconstitutional? These roads seldom cost more than at the rate of from fifty to one hundred dollars per mile; and yet these poor roads contributed more to the immediate benefit of the community at large, during a period of peace, than any of our fortifications, which cost from *one* to *two millions* of dollars each. Your memorialist is unable to perceive upon what ground a military road, upon which our troops can be marched three hundred miles in one day, can be unconstitutional, when roads upon which they could march but twenty-six miles in a day were constitutional and proper, (more especially when all are made by the troops themselves,) notwithstanding the great difference in the cost of the two kinds of military roads here alluded to. As it is obvious that the military railroads will enable our young warriors of the central and western States to fly at the rate of three hundred miles in a day to meet the invading foe, the constitutionality of such roads, as "necessary and proper means for repelling invasion," cannot but be admitted by all parties, convinced, as they must be, that we are destined in another war with any European nation to be attacked by fleets propelled by steam power. But if, as your memorialist respectfully asserts, our seaports cannot be defended against an attack by foreign armies, with the co-operation of fleets propelled by steam power, who can doubt the absolute necessity of the proposed railroads and floating batteries? If, indeed, then, they are indispensable, and our country cannot be defended without them, they are strictly constitutional, as the most rigid constructionist will admit. To make use of our common bad roads for marching our volunteers and other troops from the central and western States to our seaports in a state of war, or to continue the use of sails, without steam power, to meet an invading foe with large fleets of steamships of war, would be as unavailing and as unwise as it would be to attempt to extinguish by water carried in a nutshell the flames by which thousands of our houses are doomed to be enveloped in the course of a war when destitute of the proposed means of defence, while possessing the power to obtain the best of fire-engines.

24. The apprehended expense of the proposed work constitutes the principal objection advanced by any statesman, or by any man of military mind, whose opinions have come to the knowledge of your memorialist. To this objection it may be answered:

First. That the apprehended appropriations to meet the expense will be no more than eleven millions of dollars a year for a period of six years, provided the work is done by the army of the United States, as heretofore suggested.

Second. The employment of the army upon the work will be to the officers and men, and to the youth of every State and district through which the work will extend, the best of all possible schools to prepare them for the defence of their country; as the officers and men so employed will have the proud satisfaction of knowing that every day's labor in this essential work of preparation will contribute to increase their moral and physical capacities for usefulness and

domestic happiness in peace, and for a glorious triumph over the invading foe in war.

Third. In exhibiting the cost of this system of defence, it is gratifying to find that of the $66,000,000, which is the estimated amount required for the seven railroads from the central States to the seaboard and northern frontier, with five floating batteries for the Mississippi river at the passes, and below New Orleans, and five others for the defence of the harbor of New York, more than sixty-three millions of that sum will be expended for materials and work which the interior of the United States will afford.

Fourth. The most costly material required for the work will be bar-iron for the railways, and sheeting for the sides and tops of the floating batteries; of this article, not less than 500,000,000 pounds will be needed. This quantity, at four cents, will amount to twenty millions of dollars.

Fifth. For supplying the whole of the iron, it is proposed to erect at convenient places near the site of each one of the seven great railroads *a foundery and a rolling-mill*, for the manufacture of the iron required, upon the same principle that armories are established by the United States for supplying the army and navy and the militia with cannon and small arms. By these works ample supplies of the best of iron may be obtained in season to complete the railroads and floating batteries in the time here suggested.

We shall, in this way, lay open to the individual enterprise of the people of the United States rich mines of wealth hitherto but little known; and we shall moreover relieve ourselves of the reproach to which we have for many years been subjected—the reproach of sending to Europe and expending there many millions of dollars for iron, whilst most of our States abound with inexhaustible supplies of this valuable metal equal to any in Europe.

25. The great revolution which steam power has produced in its application to everything that is wafted upon the sea and that rolls upon the land, applicable to the attack and defence of seaports, leaves our country absolutely *destitute of the means of defence* indispensably necessary to the protection of our seaports against any nation or community of men, or pirates capable of attacking us with a respectable fleet of steamships of war, armed with the improved battering cannon of the largest calibre, without floating batteries of sufficient strength and number to enable us to lock up our seaports and railroads extending from the central and western States to the principal seaports, for marching our disposable force and munitions of war of the central and western States, at one-tenth part the expense and one-tenth part of the time that their movement on our present bad roads would cost.

26. The floating batteries here recommended constitute the most sure and economical means for the immediate defence of our seaports in war; and when aided by the proposed railroads, in the rapid transportation of troops and munitions of war from the central and western States to the principal seaports of the Atlantic, southern, and northern States, aided at sea by steamships of war, we shall thus render our means of defence complete and impregnable in war. And on the return of peace, when all other expensive means of defence, such as fortifications, armories, and fleets propelled by wind and sails are useless, then our floating batteries and railroads, turned to commercial purposes, will contribute to deepen our ship channels and to the improvement of our seaports, and afford facilities to our interior commercial intercourse, which it is believed will replace every dollar expended in carrying into effect this system of national defence in from seven to ten years.

27. The floating batteries and railroads, embracing the system of national defence here recommended, which will cost not more than eleven millions of dollars a year for six years, will, it is confidently believed, by the simple process of its construction, contribute more to qualify the army, and the young men of the United States employed upon the proposed floating batteries and railroads, for

active military service in the national defence, than they could possibly be qualified by the expenditure of double the estimated amount of the work paid for giving each one of them a complete military education, according to the system pursued at the Military Academy at West Point; as in that system the theory of the art of war alone is acquired, and much of that *mere theory* is rendered useless by the revolution which steam power has produced in all that relates to the movement of armies and fleets, and the attack and defence of seaports; whilst in the system here recommended, the young student upon the floating battery, as well as upon the railroad, is enabled, from the first moment he takes in hand his book to study the theory, at once to combine with it the practical science and manual labor of his profession; and when, at the end of four or five years, he graduates and obtains his discharge, his mind, limbs, and body would be alike improved and invigorated by his having learned *how to make and how to wield*, and having actually assisted in making and wielding floating batteries and vehicles of land transportation on railroads, with every other preparatory means for rendering them formidable in war and profitable in peace. This will afford him the happiness of knowing that he has rendered his country much useful public service for the public instruction which will enable him ever after to be in the highest degree useful to his country and his family, in war and in peace.

28. With the floating batteries and railroads here recommended, we can fearlessly and truly say to all Europe, and to all the world, "*We ask of you nothing but what is right, and we will submit to nothing that is wrong;*" whilst, without the proposed or some such system of national defence, such a declaration might be considered as pure gasconade; as, without floating batteries and railroads to lock up and promptly re-enforce our seaports when menaced by an enemy, it would be in the power of any one or two of the great nations of Europe (with two of whom we have boundary questions to settle) to enter any one or more of our principal seaports, and destroy the richest of our cities in the course of any day or night in the year; and in doing so, to damage our commercial establishments to the amount of more money and property than would thrice defray all the cost of the proposed system of defence.

29. The opinion has been expressed that these railroads will, during a state of peace, produce a revenue that will replace the money to be expended in their construction in the course of seven years after their completion. But should it be twenty, or even forty years, before their annual revenue is found adequate to reimburse the money expended in the construction of the work, this delay will tend to do no wrong or injustice to our immediate or remote posterity. They cannot fail to enjoy, as much we can enjoy, the benefit of our labor for *our* and *their* protection and prosperity. But the great question upon which we are now to act is, not whether we have or have not a right to tax our posterity with a heavy debt for a work that will certainly be of great value to us, and which is destined to be, in all human probability, *still more valuable to them;* but the true question is, whether it is not our imperative duty to do whatever is *obviously necessary and proper* to secure to ourselves, and also to our posterity, the means of preserving to each and all so deeply interested the blessings of that *liberty and independence* secured to us by our fathers of the revolution, in the achievement of which a great national debt was contracted for us to pay—a debt which we have most gladly and gratefully paid. And have we not good reason to believe that our immediate posterity will as gratefully pay any such debt which we may deem prudent to contract, to provide for their use and protection, as well as our own, a system of national defence, without which our and their liberty and independence would be left at the mercy of whatever nations of Europe may see fit to hold in their own hands "*the dominion of the sea?*" This will be attempted, without doubt, by the great maritime nation who first provides for herself a fleet of some fifty or a hundred

steamships-of-war, with floating batteries and railroads for securing her own seaports and her interior. This is a measure, however, more likely to be undertaken by some future combination of empires, arrogating to themselves, as the enemies of France did in the years 1814–'15, the title of "Holy Alliance," than by any one nation.

30. Our unnatural mother, England, who has had the address to subsidize most of her neighbors, and to force others to sanction her pretension to *the dominion of the sea;* and for half a century past to hold in her own hands, amid *professions* of peace and good will towards us, near a third part of our greatest eastern border State, and to hold several of their and our border savage nations ready to take the scalps of our frontier citizens; that enlightened nation, who has shed more blood than any other, if not more than *all* other nations, to secure to herself the *dominion of the sea,* has, it is believed, at this moment, among us organized bands of *spies and pioneers,* assuming to themselves the plausible character and vocation of "advocates of human freedom," more familiarly called "abolitionists." That this same England will, in due season, avail herself of her *newborn abolitionism* to secure to herself some favorite scheme of a foothold near us, to the northeast or south of us, or to pay us for our having twice beaten her, and more especially having, with our little giant navy, taken from her the glory of her long contested *dominion of the sea,* we can have no doubt. Without railroads and floating batteries, such as are here recommended, with steamships of war, *England's banner of abolitionism* may ere long be planted in Louisiana, and in every other border State upon our seaboard, from Sabine bay to Eastport, Maine. Thus may we soon behold England openly attempting by force to accomplish what her spies and pioneers have long been secretly employed in preparing and hastening, a tragedy of blood and desolation, the elements of which were principally provided and brought hither from Africa, within the last two centuries, by the outrages and avarice of this same England, in her efforts to monopolize the freedom of the seas. The incendiary fires have already been lighted up at Charleston, South Carolina, and Mobile, Alabama, and perhaps some other cities of our southern and eastern border can testify. The system of national defence here recommended will enable us effectually to guard against the apprehended catastrophe. It will do more. It will, when the proper time arrives, enable us effectually to fulfil the apparent destiny by which an overruling Providence has decreed that the African savages should, by the simple though often abused process of the slave trade, with the long continued pilgrimage of slavery which they are undergoing, (a slavery marked as it has been here, ever since the reign of England ceased among us, with a high degree of humanity and benevolence,) when the proper time arrives, namely, whenever, in the next century, our own *caste and color* shall have increased so as to amount to *two hundred millions* of free white inhabitants, then it is believed that our statesmen will see clearly the propriety of preserving every acre of the national domain for the support of our own *caste and color;* then shall we plainly see, and cheerfully do what we can to fulfil, that apparent destiny—a destiny by which the supposed evils of the slave trade, and of the slavery of the Africans in America, shall eventually contribute to cover that benighted quarter of the globe with all the blessings of civilization and freedom. A consummation not more devoutly to be wished, than it is certainly to be accomplished within the coming century; unless, indeed, the great work is delayed by the lawless interference of the blind votaries of abolitionism, or by the apprehended incapacity of the African blacks for self-government. Be this as it may, our own United States republic of the coming century will, in all human probability before the middle of that century—say 80 or 90 years hence—have it in their power to make, for the first time since our political existence, a fair experiment towards the solution of the long contested problem, involving the question of

the utility of Africans when left alone as members of a free civilized community—the question upon which their possible capacity for self government necessarily depends; for we shall then be able to spare from our two hundred millions of free white population a fleet of steamships-of-war, with an army of missionaries and United States volunteers, for the instruction and protection of the numerous savages of Africa: the terms *protection* and *instruction* are here employed in connexion with each other, because these two great engines of civilization have always gone side by side, wherever the work of civilization has succeeded best. That complete instruction necessary to all the purposes of civilization and self-government, as we understand it, never was, nor ever can be perfected without *military protection.*

This navy and army of *protection* and *instruction* may be accompanied and followed by such detailed corps of the *instructed* blacks of our country as may be qualified to assist in the great work: these detailed corps to continue, with the consent of their owners, until every black in America shall find a *comfortable* and a *safe* home in the land of his fathers. Any other system of abolition would inevitably *delay* though it might not defeat the accomplishment of the great work of giving civilization and self-government to Africa, and of giving to the *United States republic* the glory of the achievement—of giving civilization and self-government to two quarters of the globe; first to America, and next to Africa. To secure to ourselves the *happiness, the imperishable glory,* of giving to America and Africa all the blessings of civilization and self-government, we have only to do that which we are now admonished by every dictate of the first law of nature to do quickly for our own preservation—that which we possess more ample means of accomplishing before the year 1846, than the patriotic people of New York possessed to enable them to complete their magnificent canal before the year 1826—namely, to locate and construct the proposed railroads and floating batteries; as by the simple operation of the execution of this work, we shall insure the instruction of all the young men of our country that may be necessary or desirable as engineers or scientific mechanics to teach millions of the youth of South America and Africa the art of covering *their country,* as we shall have covered *our* country, with these essential means of *national defence* and *national wealth.* The missionary, whose sacred duty it is to extend to every people the blessings of the Christian religion, may with perfect propriety himself learn to be a scientific mechanic and a practical engineer. He may thus add the attractive power of *practice* to *theory;* and to the sublime precepts of Holy Writ, and in teaching men *how to live* and *how to die,* teach them also how to preserve unto their country the things that belong to their country; and how to *defend and protect* the helpless women and little ones *confided to their care,* in obedience to the *solemn mandate* which should apply alike to each social and political union most dear to us, namely: "*Those whom God hath joined together, let no man put asunder.*" Such will be—such *must be*—a portion of the glorious results of our carrying into effect the proposed system of national defence. But if we neglect it until the crowned heads of Europe shall have leisure to prepare another holy alliance, with fifty to one hundred first-rate ships-of-war adapted to the action of steam power, we may, possibly in the next ten years, see our foreign commerce under the control of that holy alliance; and if we resist—and who will have the hardihood to say *we will not resist?*—we may be told by the vain diplomatists of that imperial combination of pirates—"Yankees! the holy alliance is graciously pleased to permit you, with your wives and children, to seek an asylum beyond the Rocky mountains." Otherwise we must submit to the degradation of seeing all our seaports in the possession of the invading foe; or, of seeing our commercial cities battered down, without the possibility of our bringing to their succor sufficient force in time for their protection.

31. To obviate any such calamity as the foregoing views suggest as possible, your memorialist prays Congress to provide for the construction of the proposed

works. Or, should some previous experiment be desirable, he prays that he may be authorized by law to select and employ, under the authority of the President of the United States, such engineers and other officers, scientific mechanics, artificers, ship-carpenters, and laborers, as may be necessary to enable him forthwith to locate and construct, upon the principles and in the manner here stated, *one of the proposed principal railroads*—say that from Lexington, Kentucky, to Nashville, and thence to New Orleans; or the one from Louisville, Kentucky, *via* Nashville, to Mobile; or that from Memphis, Tennessee, to meet the one already completed from Charleston, South Carolina, and Augusta, Georgia, to Tennessee river. And also to construct three of the proposed floating batteries, viz: two for the harbor of New Orleans, and one for the harbor of Mobile; to be constructed under his direction, in accordance with the project here recommended, and under the immediate superintendence of such officers as he may select. And when the floating batteries and railroads here recommended are completed, armed, equipped, and manned, the said floating batteries and railroads to be sujected to a scrupulous inspection by such committee of Congress, and by such other public functionaries as may be authorized by Congress, or by the President of the United States: provided that no *military or naval* officer be selected for any such inspection, *but such as shall have been in battle and witnessed the effect* of the enemy's cannon shot upon our works of defence; to the end that by such inspection the precise *character, value, and utility of these works of internal improvement as means of national defence and national wealth, taken in connexion with each other, may be fully ascertained and certified.* Under such authority, with two regiments such as the foregoing organization contemplates, sustained by an appropriation of three millions of dollars a year, for three years, your memorialist pledges himself to complete in this period of time the proposed *railroad* and *three floating batteries;* which will serve as an experiment upon which the residue of the works here recommended may be safely undertaken.

32. Your memorialist having, at different times during the last seventeen years, submitted to the proper authorities of the War Department most of his views contained in the foregoing 30 sections, as will more fully appear from his official reports, (which he prays may be called for and taken as a part of this memorial,) he has thus repeatedly appealed to the War Department, but he deeply regrets to say that his appeals have been wholly unavailing. He now respectfully calls on every member of the national legislature who loves his country and her institutions to sustain his efforts in preparing for her a system of defence worthy of their fathers of the revolution, worthy of the Union, and of the Constitution which we all stand pledged to support. Your memorialist did not enter the service of his country for the mere selfish enjoyment of the *pomp* and *ephemeral honors of the field of battle*, (though he would not shrink from a comparison of *his services in battle* with those of any other United States commander now living;) his anticipated glory and great object have been to employ her means of defence, ample as they must ever be, so effectually as to convince her neighbors that *honesty is the best policy*, and that *defeat must attend their every act of invasion;* and thus to direct *the elements of war to the attainment of "peace on earth and good will towards men."* With these impressions he deems it to be an act of common justice to himself, his wife, children, and friends, that he should solicit the only *relief* to which a United States general officer, honored as he has long been with one of the highest commands in the army, and whose best efforts are ever due to his country's service, can with propriety claim. He claims to *be the author and inventor of the system of national defence* herein set forth and explained; he therefore prays Congress to confirm his claim by such *act or joint resolution* as in their wisdom shall seem just and right. And your memorialist, as in duty bound, will ever pray.

EDMUND P. GAINES.

NASHVILLE, *December* 31, 1839.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, April 24, 1840.

SIR: I have the honor to acknowledge the receipt of your letter of the 17th instant, referring to this bureau a memorial of Major General Gaines, proposing a system of national defence, of which he enumerates, as an essential part, an extensive series of railroads. Upon these last, your directions are that I should submit an estimate of the probable cost.

The various routes enumerated by the general will be found in the 10th page of his memorial. According to his computation, they would embrace about 4,200 miles; are to be laid in double track; and would cost, on an everage, $15,000 the mile.

The routes are—

1st One principal railroad from Lexingto, Kentucky, to Buffalo or Plattsburg, New York, with branches to Detriot, Albany, and Boston.

2d. One principal railroad from Knoxville, Tennessee, to Norfolk, Virginia, or Baltimore, Maryland, with branches to Richmond, Virginia, and Newbern, North Carolina.

3d. One principal railroad from Memphis, Tennessee, to Charleston, South Carolina, or Savannah, Georgia, with branches to Milledgeville, Georgia, and Eest Florida.

4th. One principal railroad from Louisville, Kentucky, to Mobile, Alabama, with a branch to Pensacola, Florida.

5th. One principal railroad from Lexington, Kentucky, *via* Nashville, to New Orleans.

6th. One principal railroad from Memphis, Tennessee, to the Sabine ridge, with branches to Fort Towson and Fort Gibson, Arkansas.

7th. One principal railroad from Louisville, Kentucky, or Albany, Indiana to St. Louis, Missouri; and thence to the Missouri river, north of the mouth of the Big Platte, with branches from Albany, Indiana, to Chicago, and from the northwest angle of the State of Missouri to the upper crossing of the river, Des Monies.

As the general has given no precise indication of the courses which these routes would pursue, or of that of their branches, I find it difficult to determine the method by which he has ascertained the whole distance. But, taking Tanner's map of the United States as a basis, drawing straight lines from point to point, without reference to the physical peculiarities of the country, and involving but once in the consideration those parts which may be common to more than one principal route or branch, I make the distance of the whole system equal to 5,260 miles.

This is a distance of air lines, and of course is much less than what would be the actual distance of the roads. Their windings and sinuosities would much increase that length, to an extent which I think may, with propriety, be assumed as equal to 20 per cent. and which would make the entire length of roads and branches equal to 6,310 miles.

Until surveys are made and the roads located, it is impossible to make an accurate estimate of the cost. But, in the absence of these, by reasoning from probabilities and from experience in cases somewhat similar, one may arrive at a result which may be considered as a probable minimum. The general reasons upon the supposition of a double track, throughout; but I doubt if this be necessary. A single track, with suitable turnouts, and double lines of some extent in particular localities, will probably be found adequate to all the objects of the roads. As the roads are intended for great speed as well as great weights, and are to be national roads, they must be made of great strength as well as of durable materials; and as they will cross the country in so many

directions, they will no doubt encounter all the causes of great expenses in such structures—rock excavation, deep-cuts, tunnels, heavy embankments, extensive bridges, &c.

Under these considerations, and after having, in addition to my own investigations and observations, consulted some of the most experienced and most eminent railroad engineers of our country, I find myself obliged to differ with the general in reference to probable cost. He states the average, on the supposition of a double track, at $15,000 per mile. I cannot, consistently with my own views, state it at less than $20,000 the mile, for a single track and its requisite accessories; and this amount I desire also to be understood as my opinion of a probable minimum.

Six thousand three hundred and ten miles, at $20,000 the mile, will amount to $126,200,000.

There is no doubt that many advantages may be taken of the railroads already made and being made by States and incorporated companies, in adopting them as parts of the major general's system, but one cannot say to what extent, until the same shall be shown by the surveys. If we suppose it, however, to be equal to 1,000 miles, it will reduce the cost before stated to $106,200,000.

The objects of these various roads being to transport masses of troops and munitions of war with great speed and to great distances, means of transporting will have to be provided, and will also have to be under the exclusive control of the government, which last condition makes it necessary that these means should be owned by the government; they become, then, an essential part of government expense belonging to the system.

These means are locomotives and cars. A car that would properly accommodate 50 men with their arms and necessary baggage would probably not cost less than $500. To transport 10,000 men, then, would require 200 cars. We will now suppose that to move these cars with the anticipated speed will require one locomotive to each train of ten cars; there must, then, be twenty locomotives, which, with the requisite tender to each, will not cost less than $8,000 apiece. It will, therefore, be necessary for the transportation of 10,000 men to have 20 locomotives and tenders and 200 cars. This may be considered as an equipment for one of the principal lines; but as there are seven principal lines, and as each should be supplied with an equipment adequate to the transportation of 10,000 men, there will have to be, for the whole system of roads, not less than 140 locomotives and tenders and 1,400 cars. Applying to these the prices which we have stated, it will make the cost of the means of transportation equal to..... $1,820,000

To which add the cost of the roads..... 106,200,000

And the whole will be..... $108,020,000

I have, in the foregoing, supposed the plan to be practicable—that is, that railroads may be made in the several directions as required by the system; but it is proper to add that this is a point which cannot be determined except by accurate surveys.

Very respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Topographical Engineers.

Hon. J. R. POINSETT,
Secretary of War.

NAVY COMMISSIONERS' OFFICE, *April* 25, 1840.

SIR: The board of navy commissioners have the honor to acknowledge the receipt of the letter from the honorable Secretary of War to you, of the 16th instant, requesting your reference to them of the memorial of General E. P. Gaines to Congress, submitting a system of national defence, "for a report as to the practicability, expediency, and expense of the plan, so for as relates to floating batteries and other naval defences;" and, in compliance with your indorsement, respectfully state:

That in relation to the "expense," the board called upon the chief naval constructor for the probable cost of one of the floating batteries and a tow-boat, as described in the memorial, a copy of whose report is herewith enclosed. These estimates form the best data which the commissioners can furnish for ascertaining the aggregate expense which might be necessary to carry into effect the recommendations of General Gaines. No definite number is specified in the memorial, nor any other information given by which that number can be ascertained with any probable certainty; and no attempt has been made to supply the want of this information by conjecture.

There appears to be no cause for doubting that the approaches of an enemy by water to any of our cities and seaports might be prevented by the employment of a sufficient number of floating batteries and tow-boats, prepared, armed, and manned, as are proposed by General Gaines; and, consequently, that the plan is "practicable," provided the expense can be met and a sufficient number of men be obtained.

In considering the "expediency" of adopting the floating batteries which are proposed in the memorial, it is necessary to estimate their comparative efficiency with other means which may be provided, manned, and supported with an equal expenditure of money and an equal number of troops or other persons.

The board of navy commissioners, when presenting their views upon the general defences of the country upon former occasions, have expressed the opinion that, upon a subject so important and evidently requiring the best combinations of military and naval force, it was very desirable, if not indispensable, that it should be considered and reported upon by a board which should comprise officers of both branches of the service. This belief has not been changed by any subsequent information or reflection upon the subject, and consequently they can only offer opinions upon the relative advantages and disadvantages of the floating batteries and fixed fortifications, which are based upon facts that appear to be too well established or so obvious as not to be questioned.

The system presented in the memorial is intended "to provide for the defence of our seaports," and "to enable us to repel, by the agency of steam power, every invasion suddenly forced upon us by fleets propelled by steam power." To effect this object, the memorialist proposes floating batteries and attendant tow-boats, which he has described in very general terms, and considers them preferable to fortifications with cannon placed on the banks of rivers or inlets; because with such fortifications only it would be utterly impracticable to lock up a navigable river or inlet, or to arrest the movement of a fleet thereon. He also prefers the floating batteries to steamships-of-war, unless such ships should be prohibited from leaving the vicinity of the ports or harbors to which they may be assigned. From these general views it appears to be the intention of the memorialist that each and every port or harbor shall have at all times all the means for defence against a naval force which may be necessary to resist attacks until reinforcements can be obtained from the interior; and that no reliance is to be placed upon the concentration of these separate floating defences from contiguous ports for temporary purposes.

There can be no doubt that such a perfect system of defence would be very desirable, if it could be obtained with a proper regard to its cost and its de-

mands upon the population of the country. But if the probable expense of the construction and maintenance of the floating batteries and tow-boats which would be required, and the number of persons necessary for their advantageous use, are considered and compared with the resources of the country, reasonable doubts may be entertained whether an attempt to obtain complete security in this manner would be expedient.

That floating batteries of some kind will be necessary as component parts of the defences for several of our harbors is generally admitted, and it is believed formed a part of the plan of defence as proposed by the board which had that subject under examination shortly after the close of the last war for those passages to important points which could not be well and thoroughly commanded by the fortifications on the land.

One of the strongest objections which is usually made to fixed fortifications is, that they must of necessity await an attack, and leave the choice of time and circumstances to an enemy. The greatest advantage of a floating force over fixed fortifications consists in the greater power which they possess of choice of position, with facility and promptitude to meet in the best manner any form of attack with which any point may be threatened. All varieties of floating force are liable to greater danger from shells and hot shot, and require much larger amounts, in proportion to their original cost, to keep them in repair than fixed fortifications.

In considering the defence of a coast so extensive as that of the United States, and upon which there are so many positions which are important either for their commercial, military, or political relations, the Board of Navy Commissioners, when they refer to the probable nature and force of the attacks which may be expected from a naval enemy, and the physical, fiscal, and personal resources of the country to meet them, are led to the conclusion that many points must be left more or less exposed for many years; and that, while permanent arrangements are made for giving security to others in proportion to their importance, the best policy for the whole country will be to extend those movable defences which can advantageously meet an enemy at the greatest distance from his meditated points of attack, or be soonest concentrated to retard his progress, or to repel him from our shores.

This force, if composed of steam and ordinary ships-of-war, employed separately, or in combination, as circumstances may require, might, it is believed, be used (except at some few points) with at least equal advantage as the floating batteries which are proposed in the memorial, and would possess the further advantage of being able to meet and annoy an enemy in his progress, to concentrate where it should be most required, to retire, if necessary, before a superior force, and be held ready to take advantage of any accidents to the enemy, or of any mistakes which he might commit. Its powers would be active—aggressive if necessary, whilst that of the batteries proposed must necessarily be almost wholly passive and strictly defensive.

Without entering more particularly into the general subject of national defence, after a careful consideration of the employment of such floating batteries as are proposed in the memorial, the board are of opinion that, although a few such or similar batteries might perhaps be useful in particular places, it would not be expedient to adopt them generally as substitutes for fixed fortifications, or for a floating force which should be adapted to more extensive use and capable of quicker and more rapid combinations.

The papers are herewith respectfully returned.

I have the honor to be, sir, with great respect, your obedient servant,

C. MORRIS,

For the Board of Navy Commissioners.

Hon. JAMES K. PAULDING,

Secretary of the Navy.

WASHINGTON, *April* 22, 1840.

SIR: I have read the memorial presented by Major General Gaines to Congress on the defence of the coast. A part of the system proposed by the general is the construction of heavy floating batteries, the probable cost of which with their tow-boats, you require me to state. It is difficult to form an opinion on the cost of vessels of such unusual dimensions as those proposed by General Gaines; and in addition to this difficulty there are no data given on which to ground an estimate, excepting length and breadth, but it is believed that the largest battery with her tow-boats will cost about 1,400,000 dollars, and the smallest about 700,000. This estimate includes copper-fastening and coppering, cables, anchors, boats, and water-casks, but does not embrace masts, spars, sails, armament, nor stores of any description.

I am, sir, respectfully, &c.,

SAMUEL HUMPHREYS.

Com. CHARLES MORRIS,
President of the Navy Board.

HO. REPS., EX. DOC. No. 5, 32d CONGRESS, 1st SESSION.

LETTER

FROM

THE SECRETARY OF WAR,

IN

Reference to Fortifications.

DECEMBER 11, 1851.—Referred to the Committee on Military Affairs, and ordered to be printed.

WAR DEPARTMENT,
Washington, December 8, 1851.

SIR: On the 3d of March last, your honorable body adopted the following resolutions:

"1. *Resolved*, That the Secretary of War be directed to report to this House, the second Monday in December next, on the subject of the land defences of the country, in which he will review the general system adopted after the war with Great Britain, and since pursued in regard to the permanent fortifications then deemed necessary for the national defence; and that he report whether the general plan may not now be essentially modified by reducing the number of works proposed to be erected, and by abandoning some of the forts now in progress of construction.

"2. *Resolved*, That the Secretary of War also report the number of fortifications which have been built, including those nearly completed under the general system, the number in process of construction, and the number not yet commenced, but proposed to be erected, and in such form as will conveniently show the States and Territories in which the several forts are situated, or to be located; when the work was commenced, when completed, or expected to be finished; the number and calibre of the guns mounted, or to be mounted, the estimated cost, the amounted expended, and the sums yet required to finish or construct, as the case may be, each work respectively."

I now proceed to discharge the duty thus imposed on me.

On more than one occasion during the last war with Great Britain, the country had been exposed to serious misfortunes from the want of suitable fortifications at important points. Its capitol had been taken, and several of its largest commercial cities owed their preservation from the same calamity to the undisciplined courage of troops hastily assembled for their defence. It is not surprising, therefore, that at the restoration of peace, the attention of the government should be turned to the defences of the country.

In the year 1816 a board of engineers was organized by order of President Madison, charged with the duty of preparing a general system of fortifications for our maritime frontier; and, by a resolution of Congress, adopted in the same year, the President was authorized to employ "a skilful engineer as an as-

sistant" to this board. The appointment was conferred upon General Bernard, a distinguished officer in the French army. The board of engineers, thus constituted, entered zealously on the discharge of their duties. They planned an extensive system of permanent coast defences, and surveys were immediately commenced with a view to carry it into execution. They arranged the proposed works into six classes. Class A comprised certain old works, constructed during the two wars with Great Britain, but which required alterations and repairs. Classes B, C, D, E, and F, the new works proposed to be erected, arranged in the order of their relative importance.

The plan, both in its formation and execution, appears to have been left for several years (from 1816 to 1821) entirely under the control of the Executive. Congress appears to have had no agency in it, except to make the necessary appropriations, which were made in a gross sum "for fortifications," and were expended with the approval of the department, by engineer officers, under the direction of the chief of that corps. In 1821 the practice was changed, and the appropriations were made for each work specifically.

This plan has been partially carried into execution, with a few exceptions made by direction of Congress, in the same order as that in which it was first arranged—

1. By altering and repairing the most important of the old works.
2. By commencing the new works embraced in class B; then those in class C.

From that time to the present the works have been slowly but steadily advancing. Doubts were occasionally expressed, both in and out of Congress, of the necessity of so extensive a system, and the appropriations were frequently so curtailed as materially to retard the completion of the works, but they were suspended but for a single year.

In the year 1836, when our relations with France wore a threatening aspect, the attention of Congress was again called to the defences of the country, and the President was directed, by a resolution of the Senate, adopted on the 18th of February of that year, to make a report on that subject.

General Cass, then Secretary of War, took this occasion to review the whole system adopted by the board of engineers. He disapproved of several of the works recommended by them, either as useless or as unnecessarily large, and considered the whole system as on too extensive a scale. Parts of this document, referring to particular works, are no longer of any practical application, as the works to which they refer are completed; but such portions of it as relate to the general system adopted by the board, are as appropriate at the present day as they were when they were written, and whatever differences of opinion may exist on the subject to which it refers, none can exist as to the ability which it displays. The report is Senate document No. 243, of the year 1836.

In transmitting this report to the Senate, President Jackson (on such a question undoubtedly high authority) expresses his concurrence in the views of the Secretary.

Whatever effect this report may have had on the Congress to which it was transmitted, it does not appear to have produced any permanent change in the system which, from that time to the present, has been gradually advancing, and, in but one instance, until the last session, did Congress fail to carry out the recommendations of the board. Within that period many (and those by far the most important) of the works have been completed; others are nearly so, and several have been commenced and are in various stages of advancement. I herewith append a tabular statement, in which the works recommended by the board are arranged into their respective classes, showing the works on the Atlantic and Gulf of Mexico that are complete, or nearly so; those that are in progress of construction, and those that are proposed to be built, but which have not yet been commenced, together with the cost, actual or estimated (as the case

may be) of each work, the number of guns for which it is calculated, &c. I also append sectional maps showing the exact position of each work, executed or proposed, and exhibiting to the eye its actual state, that is, whether it be completed, in course of construction, or not yet commenced. From this statement, it will be seen that the number of all the works recommended by the board, on the Atlantic and Gulf of Mexico, including old works repaired, is one hundred and fifty-seven, carrying, in the aggregate, 12,685 guns.

That the cost of repairing the old works, class A, has been		$3, 583, 742
The cost of the new works that are completed, ornearly so, class B, has been		13, 172, 966
Making, of all sums expended since the year 1816 to the present day, in the construction and repairs of the works embraced in classes A and B, an aggregate amount of		$16, 756, 708
To complete them will require		1, 123, 896
That on the works now under construction, class C, there has been expended	$3, 902, 828	
To complete them will require	5, 028, 194	
Making, as the estimated aggregate cost of the works now under construction, class C, the sum of		8, 931, 022
And that the estimated cost of all the works recommended, but not yet commenced, is		18, 147, 000
Grand total		$44, 958, 626

Thus we find that the total cost of the entire system recommended by the board for the defence of the Atlantic and Gulf coasts (including the cost of old works repaired) is estimated at $44,958,626. It must be observed, however, that a large portion of the estimate for works not yet commenced is purely conjectural.

Having shown what the plan adopted by the board proposed to accomplish, and how far it has been carried into execution, I now proceed to consider the question submitted by the House, whether that plan "may not be essentially modified by reducing the number of works proposed to be erected, and by abandoning some of the forts now in progress of construction."

As this question is one of vital importance to the country, I deemed it prudent to obtain all the aid that professional knowledge and experience could afford in arriving at a correct conclusion; I therefore addressed a series of questions to some of the most distinguished officers of the navy, and of the corps of engineers, which I requested them to answer. The answers to these questions are hereto appended, and, together with the able and elaborate report of the chief engineer, constitute a mass of highly interesting and instructive matter on the subject of the national defences. I have been much indebted to these interesting papers in preparing this report.

I shall first consider that part of the inquiry submitted by the House, which refers to the works now in progress of construction. The board, in carrying their plan into execution, commenced, (as I have already said,) with the most important works; it follows, therefore, that those now in progress of construction are deemed by them more important than those that have not yet been commenced, and, therefore, that if the former are unnecessary, the latter are still more so. I shall confine myself at present to the works on the Atlantic and on the Gulf of Mexico; those on the northern lakes will form the subject of a separate inquiry.

The works now in course of construction are enumerated in class C. Some

of those in class B are not yet quite finished, but they are all so nearly so as to be classed by the board among those that are completed.

By reference to this list it will be seen that several of these works constitute parts of the defences of some of our most important seaports, to wit: of Philadelphia, Baltimore, Norfolk, (with the navy yard at Portsmouth,) Charleston, Pensacola, (the only good harbor for vessels-of-war, and the only naval depot on the Gulf,) and Mobile. There can be no doubt that if any points on our coast ought to be fortified these should be among the number.

With regard to important positions like these, my opinion is that nothing should be left to chance, but that they should be fortified, so as to make them impregnable by any force that may reasonably be expected to be brought against them. In the event of a war with a great maritime power, these points would probably be the first to be assailed. Indeed they are the only ones at which we are assailable. The power of steam has, in point of time, deprived the Atlantic of two-thirds of its width, and in certainty of movement and accuracy of calculation has narrowed it still more. It is, perhaps, not going too far to say that a naval expedition from England could now calculate with more precision the time of its arrival at one of our ports, than forty years ago it could have calculated the time of its reaching the opposite side of the British channel.

It is evident, therefore, that our great cities should be prepared against such expeditions, not only in time of war, but that as war may come unexpectedly upon us, they should, even in time of peace, be always prepared to repel an attack. The only question is, how is this to be accomplished? Three different modes have been suggested:

1st. By such temporary, fixed, or floating defences as may be hastily prepared to meet an emergency.

2d. By vessels-of-war; or,

3d. By permanent fortifications.

With regard to temporary works on land, hastily thrown up, they are unquestionably often of great advantage where there are no fortifications, and sometimes have been found sufficient to repel an attack. It is manifest, however, that they ought not to be relied on as substitutes for the latter, for defending important positions like those we are now considering against vessels-of-war. Their only recommendation is their cheapness. On the other hand, they require greater numbers to defend them, and they afford less protection against the enemy's fire. Even if they were equally effectual, therefore, they would only be the means of saving money at the expense of life. But it is manifest that, even when skilfully constructed, they must be inferior, as means of defence, to permanent fortifications of solid masonry.

In respect to floating batteries there appears to be but one opinion among officers both of the army and navy. This subject was brought before Congress some years ago by a late distinguished officer of the army, who proposed them as substitutes both for fortifications and for vessels of war in the protection of our coast. The then Secretary of War (Mr. Poinsett) was directed to give his views upon it. He referred the matter to the board of navy commissioners, by whom it was fully investigated, and they conclude their report upon it by expressing the opinion "that although a few such or similar batteries might, perhaps, be useful in particular places, it would not be expedient to adopt them generally as substitutes for field fortifications or for a floating battery, which should be adapted to more extensive use and capable of quicker and more rapid combinations," to wit, a naval force.

In this opinion Mr. Poinsett concurred, and it will be seen that the officers, both military and naval, who have favored me with their views on this point, concur in the belief that, although steam batteries may, under some circumstances, be highly valuable as auxiliaries to fortifications or vessels-of-war, alone they

are inferior to either, and that from the perishable nature of the material of which they must be constructed they are far more expensive than fortifications.

It only remains to inquire whether vessels-of-war should be resorted to as a substitute for fortifications.

On this point opinions widely differ. The more prevalent one, even among naval officers, is, that the navy could not, or if it could, that it ought not to be relied on for this purpose. In this opinion I entirely concur. The objections to this mode of defence appear to me insuperable. The modern practice of nations dispenses with any formal declaration of war, and the first intimation of it may be the appearance of a hostile fleet before one of our cities, or, perhaps, simultaneously before several. Is it probable that a sufficient naval force would always be at hand ready to repel such an unexpected attack? But even when the existence of a war was well known, could a city always calculate with certainty on the presence of a naval force precisely at the moment it was needed? The vessels assigned to this duty would either cruise off the coast to watch for and intercept the enemy's fleet, or they would remain stationary in the harbor. If the first course were adopted, what security would they afford? Any one of the numerous casualties to which vessels are liable at sea might enable the enemy's fleet to pass them, and accomplish his purpose of destroying a city and millions of public and private property, or of selling forbearance at an enormous price, before our vessels were aware of its approach.

If, on the contrary, the vessels assigned to the defence of a city remained constantly in port, this would necessarily involve an immense increase of our naval establishment. The chief engineer estimates that, inasmuch as it would be necessary to retain at each important point a fleet entirely adequate to its defence, the entire naval force destined for the defence of our coast alone would have to be as many times larger than the squadron that might reasonably be expected to attack one of these points as there are points to defend. Supposing, therefore, that Boston, New York, Philadelphia, Baltimore, Charleston, and New Orleans were unprovided with land defences, each of them would require for its protection a naval force as large as any that might probably be sent against it; and as twenty ships-of-the-line would be no extraordinary armament to send on such a mission, it would require a force at least equal to that at each of the above-mentioned ports, making in all an aggregate force of one hundred and twenty ships-of-the-line for the defence of these ports alone.

The argument is, perhaps, pushed to an extreme, but it cannot be denied that, just in proportion as fortifications are dispensed with for the protection of our principal seaports, the navy must be augmented; and all naval officers who recommend a partial substitution of naval for land defences admit that such must be the consequence of the adoption of this policy. It follows, therefore, that of the two modes of defence, the naval is by far the most expensive. A few facts will more fully demonstrate the truth of this assertion.

1. A first class man-of-war, carrying say eighty-four guns, is estimated to cost $500,000. Now this sum would, under ordinary circumstances, construct a fortification that would mount two hundred and fifty guns.

The cost of building, equipping, and repairing the navy from 1816 to 1850, both included, was upwards of $51,000,000. The aggregate cost of building and repairing all the forts which have been completed and are now in course of construction will (when the latter are finished) amount to $26,811,626. The entire naval force of the United States carries 2,032 guns; the number of all the guns in the forts that are completed and being built will be 6,093, so that to keep 2,032 guns on ship-board costs nearly double what it costs to mount 6,093 on fortifications, and the first amount does not include the cost of docks and other establishments erected by the government for the construction and repair of vessels. But this is not all. It is computed that few ships last longer than forty years, and their average duration does not exceed fifteen years, and at the

end of sixteen years the expense of repairs of a ship about equals her first cost. On the contrary, a fort when once built lasts forever, and the cost of repairs is trifling. It is evident from these facts, that, supposing the two modes of defence to be in other respects equal, on the score of economy there can be no comparison between them.

I will not undertake to decide a question which has long been a subject of controversy between officers of the army and navy, and that is, the relative superiority of fortifications and vessels-of-war. It is believed, however, that few naval officers, at the present day, would venture to affirm that, in a contest between a regular fortification and a vessel-of-war, equal in the number and calibre of their guns, and in the skill and courage with which they are managed, the vessel would be likely to prove victorious.

The practice of the civilized world is opposed to such a theory. There is hardly a nation that has seaports to defend that does not resort to fortifications for that purpose, and the instances are rare in which they have failed to accomplish the object.

Some memorable instances of successful attacks by vessels-of-war on fortified places have been adduced in support of this theory, but it is probable that the result in these cases may be traced to some fortunate accident, or to causes not inherent in the two modes of attack and defence.

On the other hand, many examples may be found (some furnished by our own history) of successful resistance by forts to vessels-of-war. It would seem, too, that if there were ever any doubts on the subject, the Paixhan gun, which, it is admitted on all hands, gives great advantage to forts over vessels, must have removed them.

England is frequently cited as an example of a country which has long relied successfully on her navy for the defence of her seaports. Even if the fact were so, it would constitute no argument in favor of the adoption of the same policy by the United States. England has a small coast and a powerful navy. The United States have a sea front nearly equal to that of all Europe, and a small navy. The naval supremacy of England has always enabled her not only to protect her own commerce and harass that of her enemy, but often to drive his ships from the sea, and compel them to take refuge under the guns of his fortifications, while the proximity of her shores to those of France often enable the same squadron to overlook the ports of her enemy, and to protect her own. But it is a mistake to suppose that England relies exclusively on her navy for the defence of her ports. On the contrary, those of her ports that are most likely to invite attack, from being the sites of public naval establishments, are strongly fortified. Nevertheless, the most eminent statesmen of that country admit and deplore the insufficiency of her land defences, since the introduction of war steamers has almost bridged the British channel. What effect this new element of naval warfare is destined to produce on the destinies of England—whether it tends to increase or to diminish her maritime superiority—whether it will not, in some measure, deprive her of the immunity from invasion which her insular position has hitherto secured to her, are questions that yet remain to be decided.

I conclude, therefore, that whenever a place is considered of sufficient importance to require defences, and is susceptible of being defended by fortifications, they are in every point of view preferable to vessels-of-war.

In saying this, I mean do disparagement to the navy. On the contrary, I would still rely mainly on it for the defence of the country, but I would have them defend her, not by remaining at anchor in her ports, but by going abroad on the wide ocean, protecting her commerce and harassing that of the enemy; hovering on his coast and compelling him, instead of attacking our cities, to look to the defence of his own. These, in my opinion, are the appropriate duties of the navy, and by achievements like these have all their laurels been won.

The form of expression used in the resolution, that the Secretary of War be directed to report whether the plan of 1816 may not "*now*" be modified by abandoning the works in course of construction, would seem to imply a supposition on the part of the House that although they may have been necessary at one time they have ceased to be so now.

Great changes have undoubtedly taken place since the plan was adopted. The country has advanced with unexampled rapidity in wealth, in population, and all the elements of military power. Discoveries and improvements, directly or indirectly affecting the facilities of attack and defence, have astonished the world. Railroads have been introduced; steam has been applied to navigating the ocean; the telegraph accomplishes what would then have been considered miracles.

Among these changes there is one which, although of far less general importance than those just alluded to, nevertheless as it is directly connected with the military art, deserves to be mentioned, and that is the invention, or, at least, introduction into general use of the Paixhan gun, as it is generally called from its supposed inventor.* These discoveries or improvements are destined to exercise an influence on military affairs, the extent of which cannot be appreciated until it shall have been tested by experience.

There can be no doubt that so far as regards its capacity to resist invasion, these changes have vastly increased the relative power of this country. The rapidity with which intelligence may be transmitted, and troops and munitions of war conveyed from one extremity of the country to the other, enables us to combine the opposite advantages of an extended territory and a rapid concentration of force. These advantages, together with the augmented population and resources of the country, must remove all apprehension of an invasion of it by an army from abroad. No army could be transported across the ocean large enough to venture beyond the reach of the transports that conveyed it to our shores, and any fortifications designed to provide against such a contingency, may safely be dispensed with.

But the fortifications now under consideration look to no such event. They are designed to protect large cities from attacks by vessels-of-war, and against such attacks numbers are of no avail; the most populous city is as powerless against them as the smallest village. It follows, therefore, that neither the increase of our population nor the facilities afforded by railroads and telegraphs tend, in the least degree, to diminish the necessity of these works.

On the other hand, it is admitted by all that the introduction of war steamers, which greatly facilitate the attack on all places accessible by water, renders it more necessary than ever to fortify them against such attacks.

It is also admitted that the Paixhan gun, so terrific in its effects on all floating defences, is comparatively harmless against the solid masonry of forts, and has, therefore, rendered the latter, at the same time, more necessary and more efficacious.

I therefore conclude that if the above-mentioned works were necessary in 1816, they are still more so at the present time, and that they ought not to be abandoned.

There are several works comprised in this class (C) that stand on different ground. They are, Fort Knox, in Maine; Fort Clinch, in Georgia; Fort Taylor, at Key West; and Fort Jefferson, on one of the Tortugas islands.

Fort Knox is designed to protect Penobscot river, which has a large commerce,

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*This formidable gun is said to have been invented and introduced into our service (by the name of "The Columbiad") by the late Col. Bomford, of the ordnance, some years before the alleged discovery by the French officer who has had the honor of giving it his name. Hence the manner in which I have qualified my remarks in relation to it.

and affords a fine anchorage The large town of Bangor and several flourishing villages lie on the river and bay.

Fort Clinch is intended to defend the entrance into Cumberland sound. This sheet of water affords an excellent harbor, and the bar at the entrance, it is said, affords a sufficient draught of water for sloops-of-war and merchantmen. There is no town of much consequence, I believe, either on the sound, or on St. Mary's river, which empties into it, and the utility of this work depends upon the importance of excluding an enemy from the sound, and securing it to ourselves. Both this work and the preceding belong more properly to another class of cases to which I shall presently refer.

The two remaining works now in course of construction are those on Key West and the Tortugas. In relation to these there can be but one opinion. These islands, situated directly in the narrow channel between the southern extremity of Florida and the island of Cuba, may be said to command the northern gateway of the Gulf, as Jamaica does its southern. The latter is in possession of the only nation from whose naval power the United States have anything to apprehend. Were these islands, with their fine harbors, also to fall into her hands, they would enable her to cut off all communication between our naval forces on the Gulf and those on the Atlantic, to obtain complete control over the Gulf, and block up the vast and increasing commerce of which it is the theatre. A railroad across the isthmus of Tehuantepec (the existence of which, at no distant period, can hardly be doubted) would impart additional importance to the Gulf, as it would then become the main channel of communication between the Atlantic and the Pacific; and recent events admonish us that our progress in that quarter is watched with jealousy by more than one of the great powers of Europe.

I am, therefore, decidedly of opinion, not only that these two works should not be abandoned, but that they should be completed as soon as practicable.

It has been objected to several of the works which have been or are nearly completed, that they are on too large a scale. One or two of those which were commenced shortly after the adoption of the plan, are doubtless liable to this criticism. They are calculated not only to repel an attack by sea, but to withstand a long siege by powerful land forces. It seems to me extremely doubtful whether the strong defences on the land sides of these forts were ever necessary; be that as it may, however, there can be no question that railroads and the telegraph have, in most cases, done away with the necessity for any works on the land side, except such as may be requisite to resist a *coup de main*, or prevent an escalade. It is to be presumed that the board have modified the plan of the works now constructing so as to adapt them to the present time, and to diminish their magnitude and cost. This concludes what I have to say in relation to the works now in the course of construction.

I now come to the last branch of the inquiry proposed by the House, and and that is, whether the number of fortifications proposed to be built may not be reduced?

These works are enumerated in classes D, E, and F, and the accompanying map will show their respective positions. It will be seen by the statement A. that they considerably exceed in number those which have been completed, or are now in progress of construction.

Some of the proposed works are designed to complete the system of defences for the protection of the large seaports or naval depots. Whether these places be not already sufficiently protected by the works that have been completed, or are in progress of construction, is a purely professional question, in regard to which I have no reason to doubt the correctness of the conclusions at which the board have arrived. In regard to two of those forts, however, I will venture to offer a few suggestions. They are the two mentioned in classes D and F, which it is proposed to construct on the Patuxent river, as part of the system

of defences of Washington. The construction of these works is based on the supposition that the enemy may cross the Atlantic, ascend the Chesapeake bay to the Patuxent river, disembark a large army with all its *materiel*, including a train of artillery, and then march upwards of twenty miles through a country abounding in facilities for resisting or retarding his march, and capture this city.

It appears to me exceedingly improbable that such an attempt should be made, or, if made, that it should be successful. It is true that it was once made and succeeded, but it was under very different circumstances from those which now exist. To say nothing of the probability that there would, in time of war, at all times be found some vessels-of-war at Norfolk, lying securely under the protection of Fortress Monroe and Fort Calhoun, (neither of which existed in 1814,) a telegraphic despatch might in a few hours concentrate in the bay all the war steamers as far north as Boston, and as far south as Savannah, whereby the enemy's retreat might be cut off, and the squadron (unless a very powerful one) be captured.

In the second place, the two forts on the Potomac—Fort Washington, and the one proposed to be built at Cedar Point—would prevent the fleet from ascending that river (as they did on the former occasion) to co-operate with the army, cover his flank, and secure his retreat in case of disaster. Lastly, a more numerous and efficient militia could now be assembled for the defence of this city, in twenty-four hours, than could have been brought together in 1814 in the same number of days; and my opinion is, therefore, that these works may safely be dispensed with.

But the great majority of these works are intended to fortify places where no fortifications now exist. Whether any or all of these places are of such importance as to require permanent defences is a question in regard to which it is probable that a great diversity of views will be found to exist.

I have already given it as my opinion that all seaports where there are important public establishments, such as docks and navy yards, or where there is great accumulation of private wealth, should be strongly fortified against attacks by sea. Beyond this it is difficult to lay down any general rule, and to say where we should stop, although it is evident we must stop somewhere. General Cass, in the report to which I have already alluded, says:

"I think every town large enough to tempt the cupidity of an enemy should be defended by works, fixed or floating, suited to its local position, and sufficiently extensive to resist such attempts as would be made against it."

And again:

"All the harbors and inlets upon the coasts where there are cities or towns, whose situation and importance create just apprehension, and particularly where we have public naval establishments, should be defended by works proportioned to any emergency that may probably occur."

The correctness of these propositions may be admitted, and yet a wide field of discussion be left open, for the difficulty does not lie so much in finding a rule as in applying it to a particular case; a difficulty increased by the local and political considerations which will always exercise more or less influence on its decision.

It will be seen, however, by an examination of the lists D, E, and F, that the board have gone considerably beyond the limits which this rule would prescribe. Many of the works embraced in this list are not designed to protect any city or town that could "tempt the cupidity of an enemy," or where there are many public establishments of any kind, or "whose situation and importance could create just apprehension." Most of them are intended to protect the entrances to bays, sounds, inlets, roadsteads or harbors, the loss of which might be in

convenient to our merchantmen, or the possession of which might be useful to the enemy.

For information in regard to these works I refer to the very able report of the chief engineer, in which they are separately examined, and the object of each is fully explained. This report may satisfy Congress, though I confess it has failed to satisfy me that all of these works ought to be built.

The construction of fortifications at such points and for such purposes seems to be based on the supposition that the enemy is to have complete mastery over our coast, a supposition we are not warranted in making. On the contrary, it seems to me that the protection of our commerce, whether on our own coast or elsewhere, is the appropriate function of our navy, and may be safely left to it. We cannot expect, particularly since the introduction of war steamers of light draught, by any system of fortification, however extensive, to exclude the enemy from every bay, inlet, or creek in a seacoast on the two oceans, of several thousands of miles in extent; and there can be no great advantage in preventing his access to one when he can find another nearly or quite as good at no great distance. I admit that some of these harbors may be so important as to require fortifications, but I believe that such is not the case with a great majority of them.

In determining the extent to which we will fortify our seacoast there is one fact which we ought never to lose sight of, and that is, that every fortification which is not necessary is a positive disadvantage. Forts are elements of weakness as well as of strength, for, if they happen to fall into the hands of the enemy, they become means of annoyance and even of danger to the country by which they were erected. The strength of Gibraltar, which did not prevent its capture by the English, has enabled them to retain it, in spite of the efforts of Spain, for nearly a century and a half; and Calais was more than two centuries in the possession of the same power. Although we have no reason to apprehend that any attempt would be made to acquire permanent possession of any of our works, yet bays or harbors, in themselves of little consequence, might, if they were fortified, and the forts were taken by the enemy, become a source of great annoyance during the whole period of the war. It follows, therefore, that every fort should be provided, in time of war, with an armament and garrison fully adequate to its defence.

By statement A it appears that if all the works enumerated in the list for the Atlantic and Gulf of Mexico were completed they would require, to provide them all with proper war garrisons, 62,300 men. Those on the lakes would require 2,600 more, making, for the forts on the Atlantic side of the States, no less than 64,900 men, a larger force than the regular army of this country has ever amounted to.

I have no means of knowing what force would be necessary for the works on the Pacific; but if the system were carried to the same extent on that coast to which it is proposed to carry it on the Atlantic, to garrison all the works on both oceans in time of war would scarcely require a smaller force than 100,000 men.

The chief engineer has suggested that the militia of the neighborhood might, in a great measure, be relied on for this purpose, as it is a service to which it is well adapted. This may be true, but it does not entirely obviate the objection. This duty would differ from that for which resort is usually had to militia. It is not like hastily collecting men to resist an impending danger, and then allowing them to disperse and return to their usual avocations as soon as it is over. It would not do to leave the forts unprovided with garrisons until the enemy had actually made his appearance. On the contrary, as there would be no means of knowing when he would come, the militia would have to remain constantly in the forts. This would be particularly the case with works of the class that we are now examining, many of which are remote from any point

from which they could be speedily reinforced. For this kind of service, therefore, the militia would possess no advantage, in point of economy, over regular troops.

Great, however, as would be the expense attending this system, there is no doubt that, in a time of war, the country would cheerfully submit to it. But this is not all. These works ought not only to be protected in time of war, but even in time of peace they ought to be prepared to resist an attempt to capture them by a surprise or *coup de main*. To construct them and leave them unguarded until war has actually broken out, when the first act of hostility might and probably *would* be to seize them, would, it seems to me, be the height of imprudence.

What is a proper peace garrison for works of this sort is a question in regard to which military men differ. The strength of the garrison would depend not only on its size, but, in some measure, also, on the position of each work, the facility of speedily affording it relief, &c.

Supposing that the estimate I have made of the war garrisons of all the works erected and to be erected according to the plan of the board, on the Atlantic and the Pacific, of one hundred thousand men, to be correct, and estimating a proper peace garrison at one-tenth of this number, (which is believed to be a very low estimate,) the force required for this purpose would be almost equal to that of the present army.

Would the country submit to the burden which such a gigantic system of fortifications would entail upon it? I think not. The people of this country, although prodigal of their expenditures in time of war, are parsimonious in preparing for it. They would never consent to expend annually large sums in order to prepare for a remote and contingent danger. The consequence would be that these works, when completed, would be neglected, and would never be prepared for a sudden and unexpected attack.

We have ample experience of this fact. No military man will affirm that the works already completed are provided with such garrisons and armaments as a prudent foresight would dictate. The reverse is notoriously true, and yet within a few years past events have several times occurred calculated to admonish the government of the necessity of preparation. If these preparations have not been made, it is not because they have not been repeatedly urged upon Congress. Thus, by attempting too much, we run the risk of accomplishing nothing, or worse than nothing. I am, therefore, of opinion, that many of the works in the classes D, E, and F, particularly in the last two classes, might and ought to be dispensed with.

It is with regret that I feel constrained to differ from the board of engineers on a subject to which they have devoted so much time and attention; but this is not a mere question of engineering. To designate the points that are susceptible of being fortified, to determine the extent, character, and strength of the works, and to superintend their construction, is the province of the engineer; but whether any and which of these points it is expedient to fortify is a question of national policy, involving a great many and important considerations. This question should be fully investigated, and now is the time to make the investigation. As soon as the works now in progress of construction shall have been completed the board will enter upon a class of works of more questionable utility.

I recommend, therefore, that the department be authorized to organize a board, composed of officers of the army and navy and of civilians, whose duty it shall be to examine which of the works comprised in classes D, E, and F ought to be constructed, and whether any that are not comprised in that list be necessary; that they be directed to report to Congress the results of their

inquiry, and to state at length the grounds of their decision in reference to each particular work.

I shall now say a few words on the subject of

THE LAKE FRONTIER.

General Cass, in 1836, expressed the opinion that this frontier required no permanent defences; that we might safely rely for its security "upon those means, both in *personnel* and the *materiel*, which the extent and other advantages of our country insure to us, and which must give us the superiority in that quarter." This opinion has been ably combated by the chief engineer, and I cannot entirely concur in it.

The mercantile marine of Great Britain on Lake Ontario considerably exceeds that of the United States, and her undisputed command of the St. Lawrence enables her to augment her naval force on that lake to an indefinite extent. On the other lakes the reverse is the case; our shipping there far exceeds that of England, and every day is adding to our superiority. But to enable us to retain this advantage we must have docks and navy yards, and in time of war these establishments ought to be rendered secure against a *coup de main*. The Welland canal, affording an inland communication between Lakes Ontario and Erie, would greatly facilitate enterprises of this nature.

Statement B contains a list of the works on this frontier, with their position, strength, &c. It will be seen from this statement that there are in all eight forts on the whole northern frontier, of which only three, to wit, Fort Porter, at Buffalo, Fort Wayne, at Detroit, and a fort at Rouse's Point, Lake Champlain, are new; the remainder are old works, constructed before and during the last war with Great Britain.

With regard to the first two, as they are completed, it is useless to discuss their utility. In reference to the first, however, I presume there can be scarcely a difference of opinion. Buffalo, with the great amount of shipping always collected there, would offer great temptations to an enemy, and its proximity to the Welland canal would render an expedition against it not so improbable as might be supposed. There was, therefore, an obvious necessity for the defences at that city.

The necessity of the strong work at Detroit is not so apparent, unless the enemy should acquire the ascendency on Lake Erie or Lake Huron, an event by no means probable.

My first impressions were against the utility of the very strong fort now in course of construction at Rouse's Point. The arguments of the chief engineer, however, on this point are very strong if not conclusive. The enemy, having the command of the St. Lawrence, could, by means of their canals communicating with the head of Lake Champlain, in a very brief space of time throw a sufficient naval force into that lake to give them command of it. I think, therefore, that this work, on which a large sum has been already expended, should be completed.

The five other forts on the lakes are old works, constructed during or before the last war. As only small appropriations are required to repair and enlarge them, I do not think they ought to be abandoned.

Forts Ontario and Niagara are the only fortified places we have from the mouth of the St. Lawrence to Lake Erie; and, although they were built with reference to a different state of things from that which now exists, they would be useful in affording protection to our shipping in those waters.

Forts Brady, Mackinac, and Gratiot command, respectively, the narrow straits between Lakes Superior and Huron, and between the latter lake and Lakes Michigan and St. Clair. Although I do not think that circumstances are likely to occur to render them necessary as means of defence, I am not prepared to

recommend their abandonment. In the event of a war it will always be necessary to keep a military force on that frontier, and no more eligible stations could probably be selected than the very points at which these forts are built, being all directly in the line of communication between the lakes, where supplies could be easily sent to them and whence they could be most easily and rapidly transported to any other point where they might be needed.

The chief engineer suggests that, in addition to the works above enumerated, it will be advisable to construct one on the St. Lawrence and one or more on Lake Ontario, as a protection to our shipping in that quarter. His remarks on this subject are entitled to great weight, and will form a very proper subject of consideration for the joint board I have recommended, should this suggestion be favorably received.

THE PACIFIC COAST.

In 1848 a joint commission, composed of naval and engineer officers, was organized to make a reconnoissance of the Pacific coast, with a view to a designation of such points as it might be deemed advisable to fortify. That board has recently made a report in which they point out various positions where, in their opinion, fortifications should be constructed. These positions are divided into three classes in the order of their relative importance, and a list of them will be found appended to the report of the chief engineer. The commission recommended that measures be taken as soon as possible for the construction of fortifications at San Francisco, San Diego, and the mouth of Columbia river.

There can be but little doubt that these three last mentioned points, from their importance in a commercial point of view, will require defences, and considering their remoteness and the difficulty of affording them speedy relief in time of war, I should think that no time ought to be lost in carrying this recommendation into effect. With regard to the other points, my remarks as to the extent to which the Atlantic coast should be fortified apply with still greater force to the Pacific, on account of the difficulty and expense of constructing fortifications and of providing them with proper garrisons. I need not, therefore, repeat those remarks.

Before closing this report I beg leave to make a few remarks on a subject which, though not embraced by the resolution of the House, is yet so intimately connected with the defences of the country that the report would hardly be complete without some reference to it; and that is the

ARMAMENT OF FORTIFICATIONS.

Congress, at their last session, omitted to make the usual appropriations either for fortifications or their armament. But, whatever policy may be adopted with reference to fortifications, it will still be necessary to provide a much larger supply of ordnance than we now have on hand. By reference to the report from the head of the Ordnance bureau, hereto annexed, (marked C,) it will be seen that the whole number of guns, of all calibres, now on hand, whether in the forts or in the arsenals, amounts only to 3,535, and that of gun carriages is still smaller. The entire number of guns that can be mounted in the forts already completed, (classes A and B,) amounts to 4,572 guns; and if the works now in progress of construction should be completed, the total number of guns that would then be required for all the forts would be 6,093. It appears, therefore, that the supply of ordnance now on hand is very inadequate, even to the present wants of the service. I will observe, too, that even if Congress should determine to restrict the system of fortifications, this would not obviate the necessity for a large increase in the supply of heavy ordnance. Some means of defence must

be employed, and cannon is an indispensable part of any system that may be adopted.

It appears, too, from the reports hereto appended, that the great naval powers of Europe have, within a few years past, greatly increased the calibre of the guns mounted on their vessels-of-war. This renders it obviously necessary that the power of the batteries intended to resist them should also be proportionably increased. I believe it is the opinion of all officers, both of the army and navy, who have devoted much attention to this subject, that many of the guns now in our most important forts ought to be removed and others of longer range substituted. A glance at the report of the Ordnance bureau will show how very deficient we are in the heavy descriptions of ordnance, particularly in eight and ten inch columbiads, the most effective weapon against vessels-of-war.

To manufacture cannon of good quality is a work that demands considerable time, and as they are imperishable when properly taken care of, there is no good reason why the government should not at once provide the requisite supply.

In connexion with this subject I would venture to suggest that provisions be made for a distribution of artillery among the militia of the States and Territories. Our people are more deficient in the knowledge of this arm than of any other, and yet it is one that would be most required in a war with any European power. If a standing appropriation were made applicable to the distribution of artillery, and of the book on artillery practice among the States and Territories, it would tend very much to promote the knowledge of this essential branch of the military art among the citizens of the country.

Respectfully submitted.

C. M. CONRAD,
Secretary of War.

Hon. LINN BOYD,
Speaker of the House of Representatives.

List of documents accompanying the report of the Secretary of War of December 8, 1851, on the subject of fortifications, in answer to a resolution of the House of Representatives of March 3, 1851.

A.—Statement of fortifications on the Atlantic coast and Gulf of Mexico, the amount expended on each, and the estimated cost of completion and armament.

B.—Statement of fortifications on the northern frontier.

C.—Statement of cannon and carriages at the forts and arsenals.

D.—Report of General J. G. Totten, chief engineer.

E.—Letter to the Secretary of the Navy requesting the views of naval officers on certain points stated, and their reports, viz:

1. Report of Commodore C. Morris.
2. Report of Commodore M. C. Perry.
3. Report of Commander R. B. Cunningham.
4. Report of Commander S. F. Dupont.
5. Report of Lieutenant J. Lanman.
6. Report of Lieutenant M. F. Maury.
7. Report of Lieutenant J. A. Dahlgren.

F.—Order to the chief engineer, requiring the views of engineer officers on certain points stated, and their reports, viz:

8. Report of Lieutenant Colonel R. E. De Russey.
9. Report of Major W. H. Chase.
10. Report of Major R. Delafield.

Statement of the number of fortifications which have been built on the Atlantic coast and Gulf of Mexico, including those nearly completed under the general system adopted after the war with Great Britain, the number in progress of construction, and the number not yet commenced but proposed to be erected; and exhibiting also the States and Territories in which the several forts are situated or are to be located; when they were commenced, when completed, and when they are expected to be finished; the garrisons required for each in time of peace and in war; the number and calibre of the guns mounted or to be mounted; the estimated cost of construction and armament respectively; the amount expended for construction or repair; and an estimate of the amount required to finish or construct; and the total amount required to be appropriated to complete the armament.

Designation of the work, and State in which located.	Garrison in peace, companies.	Garrison in war, number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.†	Amount required to complete or to construct.	ARMAMENT.														Estimated cost of armament, including 100 rounds of ammunition.
								42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total number of guns.	
CLASS A.—*Old works of the first and second systems to be retained (some temporarily, some permanently) in the new system, including the works repaired, those undergoing repairs, and those to be repaired only in the event of impending war.*																							
1. Fort Sullivan, Eastport, Me*	....	180	.....	.....	$10,000	.....	$10,000		5	21	...	...	3	..	4	..	1	2	..	...	...	...	36	$33,735
2. Fort Edgecomb, Wiscasset, Me*	...	60	.....	.....	5,000	.....	5,000	....	....	12	...	...	....	..	....	..	....	....	..	...	...	...	12	9,984
3. Fort Preble, Portland harbor, Me*	1	200	1836	.....	58,811	$51,311	7,500	....	19	....	...	1	6	..	16	..	2	2	2	...	...	...	48	48,432
4. Fort Scammel, Portland harbor, Me*	...	300	1836	.....	59,826	59,826	.....	....	12	30	...	...	3	..	15	..	..	2	1	...	...	...	63	57,096
5. Fort McClary, Portsmouth harbor, Me	....	80	1836	1850	20,582	20,582	.....	....	5	....	...	...	6	..	4	..	..	..	..	...	...	...	15	13,917
6. Fort Constitution, Portsmouth harbor, N. H. ...	1	250	1836	1851	17,691	17,691	.....	....	21	14	4	..	6	..	7	..	2	4	..	...	...	...	58	56,815
7. Fort at Gloucester harbor, Mass*	....	80	.....	.....	10,000	.....	10,000	....	8	....	...	...	3	..	2	..	..	2	..	...	...	...	15	14,970
8. Fort Pickering, Salem harbor, Mass*	....	60	.....	.....	5,000	.....	5,000	....	....	6	...	...	3	..	....	..	1	1	..	...	...	...	11	11,151
9. Fort Lee, Salem harbor, Mass*	....	40	.....	.....	2,000	.....	2,000	....	8	....	...	...	....	..	....	..	....	....	..	...	...	...	8	7,944
10. Fort Sewall, Marblehead harbor, Mass*	...	125	.....	.....	10,000	.....	10,000	....	....	18	...	...	3	2	2	..	....	2	..	...	...	...	27	23,698
11. Fort Independence, Boston harbor, Mass*	1	500	1833	.....	524,594	514,594	10,000	6	49	25	...	...	20	15	15	..	2	4	..	...	...	...	121	109,737
12. Fort Winthrop, Boston harbor, Mass*	1		1841	.....	115,000	75,427	39,573	....	....	41	...	...	....	..	25	..	....	2	..	...	...	...	68	60,812
13. West Head battery, Governor's Island, Boston harbor, Mass	....	400	1841	1845	5,144	5,144	.....	....	9	....	...	...	....	..	....	..	....	....	..	...	...	...	9	8,937
14. Southeast battery, Governor's Island, Boston harbor, Mass	....		1841	1843			.....	7	....	....	...	...	....	..	....	..	....	....	..	...	...	...	7	8,295

15. Fort at New Bedford harbor, Mass	....	60	1841	1845	5,000	5,000	.....	...	....	9	..	..	2	..	.....	..	1	2	..	..	..	..	14	14,074
16. Fort Wolcott, Newport harbor, R. I*	....	200	.....	.....	10,000	.....	10,000	....	....	34	..	..	..	..	7	..	..	2	..	..	..	..	14	37,600
17. Fort Green, Newport harbor, R. I*	....	40	.....	.....	2,000	.....	2,000	....	....	8	..	..	..	..	.....	..	..	.....	..	..	..	..	8	6,656
18. Fort Trumbull, New London harbor, Ct*	1	350	1838	.....	250,941	250,941	.....	14	14	15	3	3	3	8	18	..	1	3	1	1	..	..	88	77,926
19. Fort Hale, New Haven harbor, Ct.*	....	30	.....	.....	5,000	.....	5,000	...	...	6	..	..	..	..	.....	..	..	.....	..	..	..	4	6	4,992
20. Fort Columbus, Governor's island, N. Y*	2	800	1831	.....	269,467	259,467	10,000	26	26	18	..	..	..	..	8	..	2	12	..	..	..	..	105	103,749
21. Castle Williams, Governor's island, N. Y*	....		1831	.....					53	26	..	..	..	4	8	..			..	..	..	..	78	79,332
29. South battery, Governor's island, N. Y	....		1831	1845	.....	.....	.....	...	5	....	5	..	..	..	4	..	..	.....	..	..	..	..	14	12,184
23. Fort Gibson, Ellis's island, N. Y*	....	80	1841	1844	5,096	5,096	.....	10	..	..	..	..	..	..	2	..	1	2	..	..	..	..	15	18,672
24. Fort Wood, Bedlow's island, N. Y*	....	350	1841	.....	245,689	213,000	32,689	26	17	....	11	..	6	..	13	..	..	2	2	..	..	..	77	76,540
25. Fort Richmond, Staten island, N. Y*	....		1847	.....	505,808	205,606	300,202	....	58	....	..	..	..	24	58	..	..	..	..	..	..	..	140	124,302
26. Fort Tompkins,† Staten island, N. Y*	....	1,000	.....	.....	.....	.....	.....	.....	.....	32	..	2	..	10	7	..	4	8	..	..	1	..	64	59,209
27. Battery Hudson, Staten island, N. Y	1		1841	1846	20,081	20,081	.....	40	....	....	..	..	..	..	10	..	..	..	..	..	..	..	50	57,060
28. Battery Morton, Staten island, N. Y	....		1841	1846	3,508	3,508	.....	9	....	....	..	..	..	..	.....	..	..	.....	..	..	..	..	9	10,665
29. Fort Lafayette, Narrows, New York harbor, N. Y*	1	370	1812	....	348,573	341,941	6,632	24	24	18	..	2	2	..	6	..	..	..	..	..	..	..	76	75,778
30. Fort Mifflin, Delaware river, Pa*	1	200	1836	.....	83,999	81,999	2,000	....	9	28	4	..	..	..	8	..	..	4	..	..	..	..	53	47,745
31. Fort McHenry, Baltimore harbor, Md	1	350	1836	1840	146,663	146,663	.....	19	11	20	..	..	6	..	7	..	2	7	..	..	..	2	74	75,913
32. Fort Madison, Annapolis harbor, Md*	....	150	1846	.....	45,000	15,000	30,000	....	...	16	2	2	3	..	5	..	1	1	..	1	..	..	31	27,012
33. Fort Severn, Annapolis harbor, Md*	....	60	1841	.....	6,484	6,484	.....	....	....	7	..	..	3	..	2	..	..	2	..	..	..	..	14	12,850
34. Fort Washington, Potomac river, Md	1	400	1816	1848	575,369	575,369	.....	....	..	67	3	4	3	..	7	2	..	2	..	..	..	..	88	73,379
35. Fort Johnson, Cape Fear river, N. C*	....	60	.....	.....	5,000	.....	5,000	....	....	10	..	..	..	..	.....	..	..	.....	..	..	..	..	10	8,320
36. Castle Pinckney, Charleston harbor, S. C*	½	100	1829	.....	43,809	43,009	800	8	....	10	..	..	..	..	4	..	..	1	1	1	..	..	25	23,906
37. Fort Moultrie, Charleston harbor, S. C*	1	300	1841	1844	75,301	75,301	.....	...	30	....	3	9	6	..	5	..	1	..	..	..	..	..	54	48,732
38. Beaufort battery, Beaufort harbor, S. C	....	30	.....	.....	5,000	.....	5,000	....	....	6	..	..	..	..	.....	..	..	.....	..	..	..	..	6	4,992
39. Fort Jackson, Savannah river, Ga*	....	70	1842	.....	125,000	80,000	45,000	....	....	10	..	..	3	..	1	..	..	..	..	..	..	..	14	11,830
40. Fort Marion and sea wall, St. Augustine, Fla	½	100	1841	1844	51,394	51,394	.....	....	....	15	..	..	3	..	5	..	..	..	1	1	..	..	25	20,821
41. Fort Barrancas and barracks, Pensacola, Fla*	1	250	1839	.....	390,574	315,574	75,000	....	11	10	5	3	3	8	4	..	..	2	..	1	..	2	49	37,384
42. Fort St. Philip, Mississippi river, La*	1	600	1841	.....	203,734	143,734	60,000	....	...	28	13	15	3	..	55	..	1	2	..	2	..	5	124	101,980
	16	8,225	.....	.....	4,272,138	3,583,742	688,396	189	394	560	53	41	79	76	334	2	22	73	8	7	1	13	1,852	1,719,126

* Expected to be completed within about one year after the amounts required complete shall have been appropriated.

† Nature of repairs not yet determined.

Statement of the number of fortifications which have been built on the Atlantic coast and Gulf of Mexico, &c.—Continued.

Designation of the work, and State in which located.	Garrison in peace, companies.	Garrison in war, number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete or to construct.	ARMAMENT. 42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16 inch stone mortars.	Cohorns.	Total number of guns.	Estimated cost of armament, including 100 rounds of ammunition.
CLASS B.—*New works (third system) completed, or so nearly completed as to be able to use all or nearly all their batteries.*																								
1. Fort Warren, Boston harbor, Mass*	2	1,500	1833	.....	$1,168,000	$1,093,000	$75,000	62	137	58	..	..	..	23	30	..	8	16	..	..	..	..	334	$336,102
2. Fort Adams, Newport harbor, R. I.*	2	2,440	1824	.....	1,691,343	1,661,343	30,000	59	90	98	21	13	12	83	27	7	3	7	5	7	7	25	464	372,384
3. Fort Schuyler, Throg's Neck, East river, N. Y.*.	1	1,250	1833	.....	873,013	848,013	25,000	48	48	70	8	12	6	70	19	6	2	7	3	5	2	12	318	255,040
4. Fort Hamilton, New York harbor, N. Y.*	1	800	1824	.....	634,752	614,752	20,000	14	18	....	5	5	6	48	8	..	2	4	..	2	1	5	118	86,757
5. Fort Monroe, Old Point Comfort, Va.*	2	2,450	1817	....	2,477,471	2,402,471	75,000	42	189	10	14	25	12	16	20	5	3	7	3	5	5	15	371	335,210
6. Fort Macon, (and preservation of its site,) Beaufort harbor, N. C.*		300	1826	.....	463,790	460,790	3,000	....	12	22	4	4	3	6	6	..	..	2	..	..	..	2	61	48,920
7. Fort Caswell, Oak island, N. C.*	½	400	1826	.....	578,221	571,221	7,000	....	20	32	2	2	3	12	8	2	1	3	..	..	..	2	87	72,711
8. Fort Pulaski, Cockspur island, Ga.*	1	800	1829	.....	958,859	923,859	35,000	....	65	53	4	....	..	4	12	2	1	7	..	..	..	2	150	138,032
9. Fort Pickens, Pensacola harbor, Fla	1	1,260	1828	1844	759,168	759,168	.. ..	63	17	49	5	13	6	26	13	..	1	4	4	4	2	5	212	185,430
10. Fort McRee, Foster's Bank, Pensacola harbor, Fla.*	1	650	1833	.....	464,426	384,426	80,000	24	24	62	..	....	3	....	36	..	..	2	..	..	..	..	151	143,726
11. Fort Morgan, Mobile Point, Ala.*	1	700	1819	.....	1,242,556	1,212,556	30,000	14	....	52	3	4	6	26	10	..	2	4	2	2	2	5	132	104,475
12. Fort Pike, Rigolets, La.*	1	300	1819	.....	476,001	472,001	4,000	....	....	28	..	6	..	9	5	..	..	1	..	..	..	..	49	36,520
13. Fort Macomb, (formerly Fort Wood,) Chef Menteur, La *	1	300	1822	.....	458,991	447,491	11,500	...	....	28	..	6	..	9	5	..	..	1	..	..	..	..	49	36,520
14. Battery Bienvenu, Bayou Bienvenu, La	....	100	1826	1851	129,571	129,571	.....	....	....	16	..	3	..	....	2	..	..	..	..	..	..	..	15	11,809
15. Tower Dupré, Bayou Dupré, La	....	50	1830	1848	32,317	32,317	.....	....	....	4	..	....	..	....	2	..	..	1	..	..	..	..	7	6,535
16. Fort Jackson, Mississippi river, La.*	1	600	1822	.....	857,608	817,608	40,000	....	....	70	..	7	3	10	50	..	1	2	..	2	..	5	150	123,669
17. Fort Livingston, Barrataria Bay, La.*	½	300	1833	.....	324,379	342,379	.....	....	....	28	..	6	3	9	5	..	..	1	..	..	..	..	52	39,064
	16½	14,200	.....	.....	13,608,466	13,172,966	435,500	326	620	674	66	106	63	351	258	22	24	69	17	27	19	78	2,720	2,332,904

* Expected to be completed within about one year after the amounts required to complete shall have been appropriated.

Statement of the number of fortifications which have been built on the Atlantic coast and Gulf of Mexico, &c.—Continued.

Designation of the work, and State in which located.	Garrison in peace, companies.	Garrison in war, number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete or to construct.	ARMAMENT. 42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total number of guns.	Estimated cost of armament, including 100 rounds of ammunition.
CLASS C.—*Works now under construction, and more or less advanced.*																								
1. Fort Knox, opposite Bucksport, Me*..	½	500	1843	....	$630,442	$130,442	$500,000	...	45	50	4	6	5	9	16	2	....	4	2	2	1	2	148	$125,663
2. Fort Delaware, Delaware river, Del*..	1	750	1833	....	1,119,914	539,914	580,000	32	32	54	....	....	....	20	10	....	1	2	....	....	....	....	151	138,074
3. Fort Carroll, Soller's Point Flats, Baltimore harbor, Md*	1	800	1847	....	1,000,000	135,000	865,000	38	76	33	....	....	....	....	12	....	....	....	....	....	....	....	159	159,546
4. Fort Calhoun, Hampton Roads, Va* ..	....	1,120	1818	....	2,394,328	1,664,996	729,332	54	54	88	....	....	....	8	20	....	....	....	....	....	....	....	224	213,708
5. Fort Sumter, Charleston harbor, S. C*..	1½	650	1829	....	827,408	677,408	150,000	41	41	33	....	9	4	....	12	....	....	2	2	2	....	....	146	140,893
6. Fort Clinch, Cumberland Sound, Fla*..	½	550	1850	....	200,000	20,000	180,000	....	29	....	5	5	3	20	20	2	....	....	3	2	1	5	95	71,496
7. Fort Taylor, Key West, Fla*	1	1,000	1845	....	1,200,000	395,000	805,000	...	88	10	....	....	3	20	42	....	....	5	5	....	2	10	185	160,725
8. Fort Jefferson, Garden Key, Tortugas, Fla*..	1	1,500	1846	....	1,200,000	210,158	989,862	....	183	36	....	....	3	....	66	....	....	5	5	....	....	....	298	273,594
9. Redoubt of Fort Barrancas, Fla*.....	....	.....	.....	....	158,930	109,930	49,000	....	....	....	8	....	3	10	....	....	....	....	....	2	1	2	26	14,179
10. Fort Gaines, Dauphin island, Ala*....	½	400	1846	....	200,000	20,000	180,000	....	25	....	5	5	3	20	20	....	....	1	2	2	1	5	89	66,473
	7	7,270	.....	....	8,931,022	3,902,828	5,028,194	165	573	304	22	25	24	107	218	4	1	19	19	10	6	24	1,521	1,364,351

* Expected to be completed within about one year after the amounts required to complete shall have been appropriated.

Statement of the number of fortifications which have been built on the Atlantic coast and Gulf of Mexico, &c.—Continued.

Designation of the work, and State in which located.	Garrison in peace, companies.	Garrison in war, number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete or to construct.	ARMAMENT. 42-pounders.	32-pounders.	24-pounders.	18-pounders.	12 pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total number of guns.	Estimated cost of armament, including 100 rounds of ammunition.
CLASS D.—*Works the first to be completed.*																								
1. Fort at the mouth of Kennebec river, Me*	.. .	500	....	....	$300,000	.....	†$300,000	....	45	52	4	6	5	9	16	2	...	4	2	2	1	2	150	$127,327
2. New Fort Scammel, Portland harbor, Me*	....	250	....	....	48,000	.....	‡48,000	....	17	18	....	....	....	9	2	....	....	....	....	....	....	....	46	37,794
3. New fort at Portsmouth harbor, N. H*	....	750	....	....	300,000	.....	†300,000	....	45	52	4	6	5	9	16	2	....	4	2	2	1	....	150	127,327
4. New Fort Pickering, Salem harbor, Mass*	1	300	....	....	174,000	.....	‡174,000	....	16	21	2	3	6	11	7	....	1	4	....	....	....	2	73	60,824
5. Fort at Jack's Point, Marblehead, Mass*	....	350	....	....	144,000	.....	‡144,000	....	32	20	2	2	3	10	7	2	1	4	....	....	....	....	88	75,217
6. Works at Provincetown harbor, Mass*	½	1,000	...	....	600,000	.....	‡600,000	40	56	56	....	....	....	20	16	....	2	6	2	2	....	.. .	200	188,220
7. New forts at New Bedford harbor, Mass*	1	500	....	....	208,000	.....	‡208,000	....	42	....	6	6	3	2	46	....	....	4	....	....	....	2	111	102,196
8. Fort on Rose Island, Narraganset Roads, R. I*	....	470	....	....	150,000	.....	‡150,000	30	27	21	....	....	....	....	12	...	1	3	....	....	....	....	94	97,590
9. Fort on Sandy Hook Point, N. J*	1	1,000	....	....	1,200,000	.....	‡1,200,000	....	106	37	....	....	12	8	104	....	....	5	5	....	4	10	291	264,797
10. Fort on Thomas's Point, Patuxent river, Md*	⅛	350	....	....	259,000	.....	†259,000	.. ..	20	25	2	...	3	6	6	2	1	2	....	....	...	2	69	59,972
11. Fort at Proctor's Landing, La*	⅛	100	....	....	100,000	.....	100,000	....	12	....	3	3	....	8	11	....	....	....	....	....	....	....	37	29,672
12. Works at Galveston bay, Texas*	1	200	....	....	300,000	.....	300,000	....	....	28	....	6	3	9	5	....	....	1	....	....	....	....	52	39,064
13. Works at Brazos Santiago, Texas*	1	200	....	....	300,000	.....	300,000	....	....	28	....	6	3	9	5	....	....	1	....	....	....	....	52	39,064
	6½	5,970	....	....	4,083,000	.....	4,083,000	70	418	358	23	38	43	110	253	8	6	38	11	6	7	24	1,413	1,249,064

* Expected to be completed within about one year after the amounts required to complete shall have been appropriated.
† These estimates are conjectural.
‡ Works have been projected for these positions.

Statement of the number of fortifications which have been built on the Atlantic coast and Gulf of Mexico, &c.—Continued.

Designation of the work, and State in which located.	Garrison in peace, companies.	Garrison in war, number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete or to construct.	ARMAMENT. 42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total number of guns.	Estimated cost of armament, including 100 rounds of ammunition.
CLASS E.—*Works to be commenced after those in class D.*																								
1. New Fort Preble, Portland harbor, Me*	....	300	...	...	$155,000	.....	†$155,000	8	15	18	4	4	6	10	6	2	...	....	....	....	1	4	78	$62,670
2. Works at Gloucester harbor, Mass*	....	500	....	....	200,000	.....	†200,000	16	30	33	....	....	....	10	8	....	1	2	....	....	....	....	100	93,274
3. Closing Broad Sound pass, Boston harbor, Mass*	....	.....	....	....	210,000	.....	†210,000	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
4. Works at Gurnet Point, Plymouth, Mass*	....	250	....	....	100,000	.....	†100,000	....	....	33	4	4	3	....	4	..	....	2	....	....	....	....	50	41,174
5. Works at Stonington Point, Conn*	....	375	....	....	200,000	....	†200,000	....	20	36	....	....	6	10	....	....	1	2	....	....	....	....	75	64,240
6. Works at Cedar Point, Potomac river, Md*	½	550	....	....	300,000	.....	†300,000	....	24	50	2	4	6	10	8	....	1	3	....	2	....	....	110	92,493
7. Works at Georgetown harbor, S. C*	....	500	....	..	250,000	.....	†250,000	....	20	44	2	4	6	10	8	2	....	2	....	2	....	....	100	82,054
8. Works in Port Royal roads, S. C*	...	550	..	....	300,000	.....	†300,000	...	24	50	2	4	6	10	8	...	1	3	....	2	....	....	110	92,943
9. Works on Tybee islands, Savannah river, Ga*	....	100	...	....	120,000	.....	†120,000	....	16	....	....	....	3	....	2	....	....	2	....	....	....	....	23	22,914
10. Tower at Pass du Heron, Mobile bay, Ala*	....	60	....	..	25,000	....	†25,000	....	...	6	2	2	....	....	2	....	....	....	....	....	....	....	12	9,304
11. Fort at Ship island, Miss*	½	400	....	....	200,000	.....	200,000	...	35	35	5	5	3	20	20	....	....	1	2	2	1	5	89	66,473
12. Works at Passo Cavallo, Matagorda bay, Tex*	½	150	....	....	175,000	.....	175,000	....	10	....	3	2	....	....	10	....	....	1	1	....	1	3	31	25,897
	1½	3,735	....	....	2,235,000	.....	2,235,000	24	184	270	24	29	39	80	76	4	4	18	3	8	3	12	778	653,436

* Expected to be completed within about one year after the amounts required to complete shall have been appropriated.
† Works have been projected for these positions.
‡ These estimates are conjectural.

Statement of the number of fortifications which have been built on the Atlantic coast and Gulf of Mexico, &c.—Continued.

Designation of the work, and State in which located.	Garrison in peace, companies.	Garrison in war, number of men.	When commenced.	When completed.	Estimated cost of construction or repairs.	Amount expended for construction or repairs.	Amount required to complete or to construct.	ARMAMENT. 42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	16-inch stone mortars.	Cohorns.	Total number of guns.	Estimated cost of armament, including 100 rounds of ammunition.
CLASS F.—*Works to be commenced last of all.*																								
1. Works at Eastport harbor, Me*	....	250	....	....	$100,000	.....	$100,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	36	$32,040
2. Works at Machias harbor, Me*	....	250	....	....	100,000	.....	†100,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	50	44,500
3. Works at Mount Desert island, Me*	...	1,000	....	....	500,000	.....	†500,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	200	178,000
4. Works at Castine, Me*	....	125	....	....	50,000	.....	†50,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	25	22,250
5. Works at St. George's bay, Me*																								
6. Works at Damariscotta bay, Me*																								
7. Works at Broad bay, Me*	..	1,000	....	...	400,000	.....	†400,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	200	178,000
8. Works at Sheepscot bay, Me*																								
9. Works in Hog Island channel, Portland, Me*																								
10. Works at mouth of Saco river, Me*	....	150	....	...	135,000	.....	†135,000	.	..	..	..	..	....	....	....	....	....	....	....	....	....	....	21	18,690
11. Works at mouth of Kennebunk river, Me*																								
12. Works at York, Me*	..	150	....	....	75,000	.....	†75,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	30	26,700
13. Works at Newburyport, Mass*																								
14. Works at Beverly, Mass*	....	250	....	....	100,000	.....	†100,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	50	44,500
15. Works at Nangus Head, Salem, Mass*	....	125	....	....	50,000	.....	†50,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	25	22,250
16. New Fort Sewall, Marblehead, Mass*	....	180	....	....	51,000	.....	†51,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	40	35,600
17. Works at Nantasket Head, Boston harbor, Mass*	...	280	....	....	174,000	.....	‡174,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	55	48,950
18. Redoubt on Hog island, Boston harbor, Mass*	..	1,700	....	....	1,020,000	.....	‡1,020,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	334	297,260
19. Works at Nantucket, Mass*																								
20. Works at Edgartown, Mass*																								
21. Works at Falmouth, Mass*																								
22. Works at Holmes's Hole, Mass*	..	625	....	....	250,000	.....	†250,000	.	..	..	..	..	....	....	....	....	....	....	....	....	....	....	125	111,250
23. Works at Tarpaulin cove, Mass*																								
24. Works at Canonicut island, R. I*																								
25. Closing west passage of Narragansett roads, R. I*	....	1,800	....	....	1,200,000	.....	‡1,200,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	403	358,270
26. New Fort Griswold, New London harbor, Ct*	....	.....	....	....	307,000	.....	‡307,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	.....	.....
27. Works at mouth of Connecticut river, Ct*	....	500	....	...	198,000	.....	‡198,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	82	72,980
28. New Fort Hale, New Haven harbor, Ct*	....	250	....	....	100,000	.....	†100,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	50	44,500
29. Fort Wooster, New Haven harbor, Ct*	....	125	....	....	48,000	.....	†48,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	25	22,250
	....	120	....	....	42,000	.....	†42,000	..	..	..	..	..	....	....	....	....	....	....	....	....	....	....	12	10,680

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GENERAL REMARKS.

In estimating for peace garrisons, it is considered disadvantageous to discipline to break up the companies when it can be avoided. Several works are reckoned as requiring peace garrisons, though they will not, at our present rate of progress, be prepared for troops for some years. Some of these garrisons might, on an emergency, be reduced for a time; but the force proposed should be regarded generally as the minimum proper to secure our ports from insult and keep watch over the military property. The garrisons, as stated, amount to forty-seven and a half companies for the Atlantic and Gulf seaboard, independent of Tampa Bay and the city of New Orleans.

The works that have been under repair of class A, and those of class B, may all be regarded as completed as respects efficiency. The expenditures still required have relation, most generally, to matters of accommodation of troops, to storehouses, sea walls, wharves, and roads; to repairs of perishable portions; to the substitution of permanent for certain decaying materials; to preservation of sites from the action of the sea, &c.

The amounts given in the column under the head of *expended for construction or repair*, include all the appropriations heretofore made. In some cases balances of these appropriations remain, and are in course of expenditure.

RECAPITULATION.

Classes and description of works.	Garrison in peace—companies.	Garrison in war—number of men.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete or construct.	Total number of guns.	Estimated cost of armament, including 100 rounds of ammunition.
Class A.—Old works repaired	16	8,225	$4,272,138	$3,583,742	$688,396	1,852	$1,719,126
Class B.—New works completed or nearly completed	16½	14,200	13,608,466	13,172,966	435,500	2,720	2,332,904
Class C.—Works now under construction	7	7,270	8,931,022	3,902,828	5,028,194	1,521	1,364,351
Class D.—Works the first to be commenced	6½	5,970	4,083,000	----------	4,083,000	1,413	1,249,064
Class E.—Works to be commenced after those in class D	1½	3,735	2,235,000	----------	2,235,000	778	653,436
	47½	39,400	33,129,626	20,659,536	12,470,090	8,284	7,318,881
Deduct value of ordnance and ammunition now on hand	------	------	----------	----------	----------	------	2,899,305
Amount still required for armament of the first five classes	------	------	----------	----------	----------	------	4,428,576
Class F.—Works to be commenced last of all	------	22,900	11,829,000	----------	11,829,000	4,401	3,916,490
Grand total	47½	62,300	44,958,626	20,659,536	24,299,090	12,685	8,345,066

B.—NORTHERN FRONTIER

Statement of the number of fortifications which have been built, including those nearly completed under the general system adopted after the war with Great Britain, the number in progress of construction, and the number not yet commenced, but proposed to be erected; and exhibiting, also, the States and Territories in which the several forts are situated, or are to be located; when they were commenced, when completed, and when they are expected to be finished; the number and calibre of the guns mounted or to be mounted; the estimated cost of construction and armament, respectively; the amount expended for construction or repair, and an estimate of the amount required to finish or construct; and the total amount required to be appropriated to complete the armament.

Designation of the works and State in which located.	Garrison in peace—companies.	Garrison in war—number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete construction or repair.	ARMAMENT, INCLUDING 100 ROUNDS OF AMMUNITION FOR EACH PIECE.														Estimated cost of armament, including one hundred rounds of ammunition.
								42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	10-inch stone mortars.	Coehorns.	Total number of guns.	
1. Fort Brady, Michigan*	1	300	....	.....	$75,000	.....	$75,000	....	....	....	10	5	3	8	2	....	....	....	....	....	....	5	35	$18,953
2. Fort Mackinac, Michigan*	1	300	.....	.....	50,000	.....	50,000	....	10	....	....	5	3	10	2	....	....	....	....	....	....	5	39	25,613
3. Fort Gratiot, Michigan*	1	300	.....	.....	50,000	.....	50,000	....	10	....	....	5	3	10	2	....	....	....	....	....	....	5	39	25,613
4. New Fort Barracks, nr. Detroit, Mich.*	1	300	1841	.....	250,000	$171,755	66,000	....	....	23	20	16	....	....	4	....	....	2	....	2	....	5	63	44,724
5. Works at Buffalo, including Fort Porter, New York*	1	300	1842	.....	150,000	116,500	33,500	....	....	44	16	....	....	....	4	....	....	....	....	....	....	....	64	51,208
6. Repair of old Fort Niagara, New York*	1	300	1840	.....	84,027	59,027	25,000	....	....	....	16	....	....	5	....	....	....	....	....	....	....	....	21	12,961
7. Repair of old Fort Ontario, New York*	1	300	1839	.....	83,013	78,013	5,000	....	....	....	20	10	....	....	....	....	....	....	....	....	....	....	30	18,610
8. Fort a the outlet of Lake Champlain, New York*	1	500	1841	.....	411,497	187,355	224,142	....	64	12	....	....	3	46	32	....	....	2	4	....	2	5	164	132,386
	8	2,600			1,153,537	612,650	528,642	....	84	79	82	41	12	73	46	....	....	6	4	6	2	20	455	330,068

* Expected to be completed within about one year after the amounts required to complete shall have been appropriated.

C.

Statement of the cannon and carriages at the forts and at the arsenals.

Names of forts.	GUNS.					COLUMBIADS.			HOWITZERS.				MORTARS.						CASEMATE CARRIAGES.				
	42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	10-inch sea-coast.	8-inch sea-coast.	8-inch guns.	10-inch sea-coast.	8-inch sea coast.	8-inch siege.	24-pounders, flank defence.	13-inch, heavy.	10-inch, heavy.	10-inch, light.	8-inch, light.	16-inch, stone.	24-pounders, coborn	42-pounders.	32-pounders.	24-pounders.	24-pounders, flank defence.	8-inch columbiads.
Castle Williams, New York	26	----	18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Columbus, New York	----	58	26	----	----	----	----	----	----	5	----	----	----	----	----	----	----	----	----	26	----	----	----
Fort Mifflin, Pennsylvania	----	30	28	----	----	----	----	----	----	7	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort McHenry, Maryland	19	30	24	----	----	----	----	----	----	----	----	16	----	----	3	----	----	----	39	72	----	16	----
Fort Monroe, Virginia	39	80	----	----	----	----	----	----	----	5	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Moultrie, South Carolina	----	14	16	----	----	----	----	----	----	4	----	----	----	----	----	----	----	----	4	----	----	----	----
Castle Pinckney, South Carolina	4	----	14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41	----	----	----
Fort Sumter, South Carolina	----	41	----	----	----	2	----	----	----	10	----	----	----	----	----	----	----	----	24	24	34	----	----
Fort McRee, Florida	24	24	64	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Ontario, New York	----	----	----	7	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Battery Hudson, Staten island, N. Y.	----	27	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Battery Morton, Staten island, N. Y.	----	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
South Battery, Governor's isl'd, N Y.	----	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Pickens, Florida	----	62	59	6	14	----	12	----	----	13	----	26	----	----	4	----	----	----	----	45	6	26	12
Fort Washington, Maryland	----	----	30	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Gibson, Ellis island, N. York	----	10	----	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Niagara, New York	----	----	----	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

C.—*Statement of the cannon and carriages at the forts, &c.*—Continued.

Names of forts.	GUNS.					COLUMBIADS.			HOWITZERS.				MORTARS.						CASEMATE CARRIAGES.				
	42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	10-inch sea-coast.	8-inch sea coast.	8-inch guns.	10-inch sea-coast.	8-inch sea-coast.	8-inch siege	24-pounders, flank defence.	13-inch, heavy.	10-inch, heavy.	10-inch, light.	8-inch, light.	16-inch, stone.	24-pounders, cohorn.	42-pounders.	32 pounders.	24-pounders.	24-pounders. flank defence.	8-inch columbiads.
Fort at New Bedford harbor, Mass	----	------	9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Griswold, Connecticut	----	12	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Trumbull, Connecticut	----	14	13	3	3	1	17	----	----	5	----	8	----	----	----	----	----	----	----	----	----	8	----
Fort Wood, New York	----	12	------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Adams, Rhode Island	----	100	49	----	----	----	----	----	----	----	----	57	----	----	----	----	----	----	----	20	11	18	----
Fort Lafayette, New York	----	72	23	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	47	----	----	----
Fort Hamilton, New York	----	33	26	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	14	----	----	----
Fort Constitution, New Hampshire	----	------	20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Independence, Massachusetts	----	20	50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Preble, Maine	----	------	12	----	----	----	1	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Macon, North Carolina	----	----	17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Caswell, North Carolina	----	------	20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Pulaski, Georgia	----	20	------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	20	----	----	----
Fort Morgan, Alabama	----	64	15	----	----	----	----	----	----	----	----	----	----	----	2	----	----	----	----	----	13	----	----
Fort Jackson, Louisiana	----	16	26	----	----	----	----	----	----	----	----	10	----	----	----	----	----	----	----	----	14	10	----
Fort Wood, Louisiana	----	------	28	----	----	----	----	----	----	----	----	8	----	----	----	----	----	----	----	----	13	8	----
Fort Pike, Louisiana	----	------	28	----	----	----	----	----	----	----	----	9	----	----	----	----	----	----	----	----	----	9	----
Fort St Philip, Louisiana	----	------	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Barrancas, Florida	----	11	10	5	3	----	2	----	----	4	----	8	----	----	----	----	----	----	----	----	----	8	----

Battery Bienvenue, Louisiana	----	------	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Tower Dupré, Louisiana	----	------	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Fort Schuyler, New York	----	25	------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	18	48	----	----	30	
Fort Marion, Florida	----	16	------	----	----	----	----	----	----	4	----	----	----	----	----	----	----	----	----	----	----	----	
Total at the forts	112	806	652	27	30	3	32	----	----	60	----	142	----	----	9	----	----	85	357	91	103	42	
Total at the arsenals	106	637	403	15	12	12	102	----	11	61	21	158	----	12	27	11	----	5	115	42	49	153	
In California, not known whether in forts	----	30	30	----	----	----	----	6	----	----	----	----	----	----	4	4	----	----	----	----	----	----	
Grand total	218	1,173	1,085	42	42	15	134	6	11	121	21	300	----	12	40	15	----	90	472	133	152	195	

C.—*Statement of the cannon and carriages at the forts, &c.*—Continued.

Names of forts.	BARBETTE CARRIAGES.										SIEGE CARRIAGES.				MORTAR BEDS.						Total number of cannon.	Total number of carriages.
	42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	10-inch columbiads.	8-inch columbiads.	10-inch sea-coast howitzers.	8-inch sea-coast howitzers.	8-inch guns.	24-pounders.	18-pounders.	12-pounders.	8-inch howitzers.	13-inch, heavy.	10-inch, heavy.	10-inch, light.	8-inch, light.	16-inch, stone.	24-pounders, cohorn.		
Castle Williams, New York	26	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	44	26
Fort Columbus, New York	----	50	44	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	89	120
Fort Mifflin, Pennsylvania	----	9	28	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	58	37
Fort McHenry, Maryland	----	37	20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	80	59
Fort Monroe, Virginia	----	39	----	----	----	----	----	----	2	----	----	----	----	----	----	----	3	----	----	----	138	169
Fort Moultrie, South Carolina	----	----	----	----	----	----	----	----	5	----	----	----	----	----	----	----	----	----	----	----	35	5
Castle Pinckney, South Carolina	----	----	10	----	----	----	----	----	4	----	----	----	----	----	----	----	----	----	----	----	22	18
Fort Sumter, South Carolina	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41	41
Fort McRee, Florida	----	----	30	----	----	2	----	----	10	----	----	----	----	----	----	----	----	----	----	----	124	124
Fort Ontario, New York	----	----	----	7	----	----	----	----	----	----	----	----	10	----	----	----	----	----	----	----	17	17
Battery Hudson, Staten island, N. Y.	----	27	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	27	27
Battery Morton, Staten island, N. Y.	----	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	10	10
South Battery, Governor's isl'd, N Y.	----	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	5
Fort Pickens, Florida	----	10	46	6	14	----	----	----	12	----	----	----	----	----	----	----	4	----	----	----	196	181
Fort Washington, Maryland	----	----	30	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	30	30
Fort Gibson, Ellis island, N. York	----	10	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	12	12
Fort Niagara, New York	----	----	----	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	6
Fort at New Bedford harbor, Mass.	----	----	9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	9
Fort Griswold, Connecticut	----	12	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	15	15
Fort Trumbull, Connecticut	----	14	13	3	3	1	17	----	5	----	----	----	----	----	----	----	----	----	----	----	64	64

Fort Wood, New York	----	12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	12	12
Fort Adams, Rhode Island	----	30	38	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	206	117
Fort Lafayette, New York	----	----	18	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	95	65
Fort Hamilton, New York	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	59	32
Fort Constitution, New Hampshire	----	----	20	----	----	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----	20	20
Fort Independence, Massachusetts	----	20	25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	70	45
Fort Preble, Maine	----	----	12	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	14	13
Fort Macon, North Carolina	----	----	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	17	6
Fort Caswell, North Carolina	----	----	12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	20	12
Fort Pulaski, Georgia	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	20	20
Fort Morgan, Alabama	----	37	14	----	----	---	----	----	----	----	----	----	----	----	----	----	2	----	----	----	81	66
Fort Jackson, Louisiana	----	----	12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	52	36
Fort Wood, Louisiana	----	---	15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	36	36
Fort Pike, Louisiana	----	----	15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	37	24
Fort St. Philip, Louisiana	----	----	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	10	10
Fort Barrancas, Florida	----	11	10	5	3	----	2	----	4	----	----	----	----	----	----	----	----	----	----	----	43	43
Battery Bienvenue, Louisiana	----	----	10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	10	10
Tower Dupré, Louisiana	----	----	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	4
Fort Schuyler, New York	----	----	20	4	6	----	----	----	8	----	----	----	----	----	----	----	----	----	----	----	25	134
Fort Marion, Florida	----	16	----	----	----	----	----	----	4	----	----	----	----	----	----	----	----	----	----	----	20	20
Total at the forts	26	367	474	31	26	3	19	----	57	----	----	----	10	----	----	----	9	----	----	----	1,873	1,700
Total at the arsenals	1	366	231	12	10	8	15	----	23	----	38	----	----	----	----	----	8	5	----	----	1,588	1,081
In California, not known whether in forts	----	20	20	----	----	----	----	----	----	----	----	----	----	6	----	----	4	4	----	----	74	54
Grand total	27	753	725	43	36	11	34	----	80	----	38	----	10	6	----	----	21	9	----	----	3,535	2,835

H. K. CRAIG, *Colonel of Ordnance.*

ORDNANCE OFFICE, *Washington, November* 13, 1851.

D.

Report of General J. G. Totten.

WASHINGTON, *November* 1, 1851.

SIR: In obedience to your orders of April 17, I have the honor to present my views and opinions on the subject embraced in the first of the resolutions adopted by the House of Representatives on the 3d March last in relation to the permanent fortifications of the country.

I shall successively take up the points which you have made particular subjects of inquiry, though I foresee that I may need your indulgence for some time, using a rather broad license in connecting them with collateral topics. I hope, also, to have your indulgence for occasionally quoting from a report on national defence, made by a board of officers to the Secretary of War on the 10th of May, 1840. I have the less hesitation in thus quoting since that report was written by myself, and its statements and opinions have been confirmed by all my subsequent meditation on the subject. As I shall, however, repeat herein a part only of what is therein set forth, and as that report goes into a pretty full discussion of the whole subject, and was concurred in by several experienced officers, whose countenance and support gives to it, indeed, all its authority, I would respectfully urge the whole report upon your attention. It is to be found in House Document No. 206, 1st session 26th Congress.

The remarks made by Mr. Secretary Poinsett, when laying the report before Congress, as given in the same document, seem to me worthy of full consideration.

I do not consider it necessary to urge the point that wars may again visit us, and wars moreover with powerful nations. All the questions of the Secretary assume this as a possibility at least, as do the resolutions of Congress calling for this inquiry. How much soever a nation may love peace, and however well disposed to preserve it by moderation, justice, and impartiality, it is not less true now than it ever has been that the interests and honor of nations cannot always be made to run in parallel courses, and that jostling and interference are the more apt to occur where there is the closer proximity by position or by the relations of trade and business.

Within the last fifteen years four or five times has this country, owing to some question suddenly rising into importance, been surprised to find itself on the very verge of war with the most powerful nations of the earth. And the latent spirit, not to say belligerent, aptitude on either side, has not always been quite satisfied that the concessions made for peace have not purchased it at too high a price. The point of honor will always, when really touched, as it ever has done, keep with nations as with men, the point of interest in subjection. And a hackneyed adage shows that it is ever deemed not less important with nations than with men that there should at all times be obvious preparation and readiness to defend both honor and interest. It is, therefore, notwithstanding certain theories of the day and public declarations, that the age of strife and warfare has passed away, only reasonable and prudent to assume that a state of war may exist, and to inquire in what way a powerful enemy may wage it against us. He may do so—

1. By attacking our commerce and navigation upon the ocean. As, however, no military preparation on the shores can avert this danger, and the means of meeting it must be purely naval, these means do not now fall under consideration; or,

2. By assailing some one or more important point or points of the coast with

a large military and naval force, with a view to immediate damage or more or less protracted occupation; or,

3. By suddenly appearing with a large squadron of vessels before our principal commercial cities, laying them under contribution, and burning or carrying off the shipping, and by making powerful attacks upon our navy yards in order to destroy those establishments; or,

4. By attacks upon smaller towns and establishments of the coast with small squadrons or single vessels, or with privateers, capturing the shipping therein, and levying contributions, and by like means intercepting the interior commerce within the bays, sounds, and estuaries of the coast; these lesser enterprises being often conducted under the countenance and support of considerable fleets.

The danger may take any of these forms, or all of them. And against any or all of these a naval force of equal or greater strength, if it could with any certainty be found at hand, might be an adequate resort, though it would not be the most economical. But, in the first place, we are yet and shall be for years inferior in our naval preparation to nations with which we are likely to be in conflict; and next, if we were even far superior, it would be impossible to have, at each of the points to be guarded, a naval force sufficient to secure it, because a hostile squadron of twenty or thirty sail of the line and war steamers, would fall with equal ease on either of the important points, and could with no more certainty be expected at one than at another; so that, to resist successfully, we must be ready at each and all, with a force not less than that of the enemy; if less, an unavailing resistance would but augment the calamitous consequences.

An enemy's squadron, assembled at Halifax or Bermuda, must be equally looked for at every important point from the Penobscot to New Orleans, inclusive, for it could with equal ease fall upon either. The same would be true, moreover, of such a force assembled in any Atlantic port of Europe.

Having seen the modes in which we may be assailed, and that no navy we are likely to possess can supply the requisite guarantees, the first question of the Secretary of War leads us to inquire, to what extent we may be aided by our numerous and multiplying railroads. This question is in the following words:

How far the invention and extension of railroads have superseded or diminished the necessity of fortifications on the seaboard?

If there are cases in which fortifications will be aided by these roads—cases in which works of less strength and efficiency may be relied on, because such aid can be afforded in moments of need—there are many others in which any such aid as they could supply would be useless, and many also to which railroads can have no application.

In very rare cases, a fort lying near existing or probable railroads may also occupy a position exposing it to a besieging army. In such a case, undoubtedly, a railroad would have a direct influence; and the strength and cost of the fort would of course be materially lessened, in consequence of the rapidity with which the railroad would bring succor.

In most cases, however, forts are not liable to a siege, nor to any attack that will keep an enemy more than a few hours before them; they are required, by sudden action, to defend the passage of a river or a channel leading to important objects; or to prevent an enemy's squadron from seizing, or cannonading, or bombarding ships, navy yards, cities, &c., duties to be accomplished only by heavy artillery in its various forms. The question whether the various forms of heavy artillery will be better placed for this purpose within forts or vessels, will be examined hereafter; but that this artillery, however arranged, is the only effectual instrument of defence, admits no doubt. This artillery being in adequate numbers, properly placed, sufficiently manned, out of the reach of seizure by the enemy, and too powerful to be silenced by him—all conditions indispensable, whether in communication with railroads or not—is prepared with

all useful accessories and ready for its great functions, independent of any aid to be supplied from without.

It happens, moreover, that few of the points necessarily occupied for this defence are so situated as to be benefited by railroads, unless the latter be constructed with the exclusive purpose of communicating with them; and some are wholly unapproachable by such means, were they ever so necessary.

As it is undoubtedly true that these communications, even as they now exist, may bring with much rapidity militia and volunteers from the interior, and from lateral sources, to many points of the coast, it may be worth while to examine a little more in detail, whether such use could be made of these superadded numbers as to justify dependence on them for defence against a powerful enemy.

Suppose a hostile fleet to be in front of the city of New York, which nothing would prevent if the channels of approach were not fortified; in what way could the 100,000 or 200,000 new men poured into the city and environs by railroads, although armed with muskets and field-pieces, aid the half million of people already there? It seems to me very clear that these additional forces would, like the population proper of the city, be utterly powerless in the way of resistance, with any means at their command; and if resistance were attempted by the city, would but serve to swell the list of casualties, unless they should at once retreat beyond the range of fire. If the enemy's expedition were intended, according to the second supposed mode of attack, for invasion or occupation for some time, of a portion of the country, then in many places this resource of railroads would be of value; because then the duty of defence would fall upon the army and militia of the country; and these communications would swell their numbers.

But of all the circumstances of danger to the coast, this chance of an attempt by an enemy to land and march any distance into a populous district, is least to be regarded, whether there be or be not such speedy mode of receiving reinforcements, and our system of fortifications has little to do with any such danger. In preparing against maritime assaults the security of the points to be covered is considered to be greatly augmented, whenever the defence can be so arranged as to oblige an enemy to land at some distance; for the reason that opportunity is thereby allowed, in the only possible way, for the spirit and enterprise of the people to come into play.

Instead of being designed to prevent a landing upon any part of the coast, as many seem to suppose, and some to allege in proof of extravagant views on the part of the system of defence, the system often leaves this landing as an open alternative to the enemy, and aims so to cover the really important and dangerous points as to necessitate a *distant* landing and a march towards the object through the people. It is because the expedition would otherwise easily accomplish its object, without landing and without allowing the population to partake in the defence, that the fortifications are resorted to. For instance, without Fort Delaware, or some other fort low down in Delaware bay, an enemy could place his fleet of steamers in front of Philadelphia by the time his appearance on the coast had been well announced throughout the city. And in spite of all New Jersey, Delaware, and lower Pennsylvania he could levy his contributions and burn the navy yard shipping, and be away in a few hours. But being obliged, by the fort above mentioned, to land full forty miles below the city, the resistance to his march may be safely left to the courage and patriotism that will find ample time to array themselves in opposition.

A distant landing is deemed to be a great advantage to the defence in all cases; and in populous districts, if the forts be sufficient for this particular duty, it makes the security complete.

It is no part of the task assumed by the system of fortifications to guard against the invasion and protracted occupation of a well-peopled district, or of a point around which the forces of the country could be soon rallied. In such

attempts railroads would accellerate the issues; but even the common modes of conveyance would soon bring forces enough to overwhelm them.

But there are places important in themselves, or necessary to the general welfare, that have not the advantage of a large population at hand or within call, and which may nevertheless be very tempting objects to an enterprising enemy. The navy yard at Pensacola will, for instance, in time of war, be of infinite value in reference to the commerce of the Gulf of Mexico. Its destruction would therefore be a great object with a maritime enemy, and it has accordingly been so fortified as to be safe from a *coup de main*, or, at any rate, will be so when the little remaining to do is complete. A hostile expedition adequate to the reduction of these defences would, however, be able to exclude all relief approaching laterally from the Mississippi, and there is no help to be supplied from the neighborhood, and none but very tardy succor to come from the interior; so that an enemy would find time to reduce the forts established on the islands at the mouth of the bay.

This case illustrates one aspect of the influence of railroads on the coast defence of the United States. While there is no such road by which succor can come from the interior, the security of the harbor and navy yard of Pensacola must depend wholly on the strength and state of readiness of the defences, naval and military, at the mouth of the harbor, there being no neighboring population; and these defences will be liable to a somewhat prolonged as well as powerful attack, giving time for sieges of several days duration.

With a railroad extending into the interior of Alabama, an attacking force, though large, would have to confine itself to comparatively brief and hurried operations, even though a short siege may be considered out of the question. But although such a railroad were made, a sudden onslaught would suffice for the destruction of the naval establishments (if there were no fortification) whenever the attacking naval force were larger than that which might be present for defence; that is to say, whenever we had not a large squadron present. As before said, the railroad can supply none of the means of resisting such attacks.

Without fortifications no existing or projected railroad would do anything towards the protection of New Orleans against a squadron of armed steamers; and not more could such communications do for Mobile or for the hundreds of large vessels that lie in the mouth of Mobile bay awaiting cargoes. There are, moreover, very great points in our system of sea-coast defence that derive their importance much more from their general relation to and bearing on general commerce and the security of large portions of the coast than from local interests. Narraganset road, Delaware Breakwater harbor, Hampton road, Cumberland sound, (Georgia,) Key West, and the Tortugas, are points of this character; and neither of these would derive material aid from any existing or probable railroad communications. It is proper here to say something of these relations.

Narraganset bay.—As a harbor this is acknowledged by all to be the best on the whole coast of the United States, and it is the only close man-of-war harbor that is accessible with a northwest wind, the prevailing and most violent wind of the inclement season. Numerous boards and commissions—sometimes composed of naval officers, sometimes of army officers, sometimes of officers of both services—have at different times had the subject of this roadstead under consideration, and all have concurred in recommending in strong terms that it be made a place of naval rendezvous and repair, if not a great naval depot—one or more of these commissions preferring it for the latter purpose to all other positions. These recommendations have not been acted on, but it is next to certain that a war would force their adoption upon the government. With the opening of this anchorage properly defended, hardly a vessel-of-war of ours would come, either singly or in small squadrons, upon the coast in the boisterous season without arming at this port, on account of the comparative certainty of

an immediate entrance; and this would be particularly the case with vessels injured by heavy weather, or in conflict with an enemy—with vessels bringing in prizes, or pursued by a superior force.

The use of the port would almost necessarily bring with it the demand for the means of repairing and refitting; and the concentration of these upon some suitable spot would be the beginning of a permanent dock yard.

For the same reason that ships-of-war would collect here, it would be a favorite point of rendezvous for privateers and their prizes, and a common place of refuge for merchantmen.

From this, as a naval station, the navigation of Long Island sound and the communication between this and Martha's Vineyard sound or Buzzard's bay might be well protected; New London harbor would be covered; this navy yard would command southwardly, as that from Hampton roads northwardly, the great inward curve of the coast between Cape Cod and Cape Hatteras, the influence of which command over the blockading operations of an enemy will be apparent when it is considered that the only harbors of refuge left to him will be the Delaware, Gardiner's, and Buzzard's bays and Martha's Vineyard sound.

The bays just mentioned belong to the class which, being too wide for complete defence by batteries, must call in such auxiliary defence as the navy may supply; and, in reference to their defence by these means, nothing can be more important than the fortifications of Narraganset roads, because all but Delaware bay, including an anchorage for ships-of-war under Block island, would be commanded by a single squadron of those floating defences lying in these roads. To a squadron of steam batteries, for instance, lying under the fortifications, it would be a matter of little consequence into which of the above anchorages an enemy should go, all being within reach of three or four hours, and some within sight. We will here observe, by the way, that this use of floating defences is in accordance with the principle before insisted on. They are not expected to close the entrance into these several bays—that would require a squadron for each at least equal to the enemy's; but as the enemy goes in merely for rest or shelter, and there is no object that he can injure, he may be permitted to enter, and our squadrons will assail him only when the circumstances of wind, weather, &c., give all the advantages to the attack. The fortification of Narraganset roads is, therefore, in effect, a most important contribution towards the defence of all the neighboring anchorages. But the same properties that make Narraganset roads so precious to us would recommend them to the enemy also, and their natural advantages will be enhanced in his eyes by the value of all the objects these advantages may have accumulated therein.

If this roadstead were without defence, an enemy could occupy it without opposition, and by the aid of naval superiority form a lodgment on the island of Rhode Island for the war. Occupying this island with his troops, and with his fleets the channels on either side, he might defy all the forces of the eastern States; and while from this position his troops would keep in alarm and motion the population of the east, feigned expeditions against New York or against more southern cities would equally alarm the country in that direction; and thus, though he might do no more than menace, it is difficult to estimate the embarrassment and expense into which he would drive the government.

It has been alleged that similar consequences would flow from the occupation of other positions, (such for instance as are afforded in the bays just mentioned,) and that therefore the defence, in a strong manner, of Narraganset roads is useless. Even allowing that there are other inaccessible positions whereon an enemy might place himself, is it a reason, because the foe can, in spite of us, possess himself of comparatively unsafe and open harbors, that we should not apply to our own uses, but yield up to him the very best harbor on the coast;

that we should submit to capture and destruction the valuable objects that accumulate in consequence of the properties of the harbor?

But it is believed that none of the outer and wider harbors will answer for such an establishment as we have supposed, nor for any other purpose than an occasional anchorage for ships-of-war, and for these reasons, among others: that although ships-of-war might possibly ride in these broad waters at all seasons, it would seem to be a measure of great temerity for transports to attempt it, except in the mildest seasons; and there can be but little doubt that a hostile expedition would resort to no harbor as a place of rendezvous, unless it afforded sure protection to its transports, these being the only means by which ulterior purposes could be executed, or final retreat from the country effected.

If, moreover, Narraganset roads became a naval station, or at least the station of a floating force designed to act against these outer waters, such an establishment by an enemy on other positions would at once be put upon the defensive and require the constant presence of a superior fleet, thus measurably losing the object of the establishment. Independent of deficient qualities as harbors, however, none of these bays would answer our purposes: First, because they cannot be securely defended; and second, because they are difficult of access from the main, the communication with them being liable to interruption by bad weather, and liable to be cut off by the enemy.

It seems quite evident that the circumstances involved in the occupation and defence of Narraganset roads will not be materially changed by the facilities of railroad communications; so far as numbers can aid in defensive arrangements they could be supplied in due time and to the extent needed, by the surrounding district and common modes of conveyance.

Delaware Breakwater harbor.—In the long stretch of coast between New York bay and the Chesapeake, a distance of about three hundred miles, there is no other entrance from the ocean (except for small vessels) than that at the mouth of Delaware bay. This circumstance led the commercial men of the country to call, with great unanimity and earnestness, for the creation at this place, which was without a safe anchorage and was full of dangerous shoals, of an artificial harbor. This call had reference mainly, it is true, to protection in stress of weather; but for the same reason, namely, the great distance on either hand to any place of shelter, it must become a place of refuge from an enemy. Vessels near that coast, whether bound north or south, will be liable to be cut off from other refuge and forced into this only entrance; and vessels bound up the Delaware must seek it, of course; so that as this artificial harbor provided by the government must be resorted to in time of war for security of both kinds, thereby becoming a place of rendezvous, it will be an attractive point for an enemy. It would, moreover, since it now yields a safe anchorage, most certainly become the habitual resort of an enemy's vessel cruising on this coast, in order to command the great channel of commerce that sweeps in near these capes.

These considerations show the necessity of defending this harbor, and its secure defence would afford the further great advantage of providing a port whence our cruisers, whether steam or sail vessels, might keep watch over this same channel of commerce whenever they were not confined within the defences by the actual presence of a superior enemy.

This case also is one in which the objects in view do not depend on the use of railroads; they can all be achieved without such aid. And it is also a case in which railroads of themselves would do nothing, and in which nothing could be dispensed with because of their existence. If the enemy landing an army were to lay siege to a fort on the shore side of the harbor, then a railroad would certainly be useful in expediting the arrival of succor. But though an enemy would certainly use this harbor for the purposes above stated, if it were not defended, it is not to be supposed that for the conquest of these advantages he would bring a great land expedition that might find much richer booty else-

where. Forts capable of resisting a *coup de main* would no doubt, therefore, fulfil their purpose and be respected, and accordingly no siege is to be anticipated, and any auxiliary force that great caution might demand could be easily and speedily forwarded by the numerous and fast steamers on the bay.

Hampton roads and Chesapeake bay.—The board of naval officers and engineers intrusted with the selection of sites for a great northern and a great southern naval depot, recommended, in their joint reports of 1819 and 1820, Burwell's bay, on James river for the one, and Charlestown, in Boston harbor, for the other. They also recommended Boston harbor and Narraganset bay at the north, and Hampton roads at the south, as chief naval rendezvous. In these reports the commissioners entered at large into the consideration of all the matters relating to these important objects, and reference is now made to those reports for many interesting details.

Such an expansion has, however, since then been given to the present navy yard at Gosport, (opposite Norfolk,) that there is little probability of any other position on these waters being occupied for such purposes.

The great importance of retaining Hampton roads during a war, and of covering the navy yard, is conceded on all hands. But the bearing of this harbor upon the general defence of Chesapeake bay is not generally understood.

Being the great naval depot station and rendezvous of the southern coast, it may be safely assumed that this harbor, during war, will never be without a number of ships-of-war, some ready for sea, others just returned from sea, and others held in condition to be suddenly despatched. This being so, should an enemy with a small or moderate force venture up Chesapeake bay, with designs upon any of the rivers, harbors or towns, his capture would be inevitable by the squadrons of sailing and steaming vessels issuing upon his rear from Hampton roads. This certain result would keep back any enemy from any such predatory venture. If, then, we provide adequate defences for the more important places upon the bay and its tributaries, there will remain no temptation to large expeditions, and the peace of this wide-spread navigable water and the safety of the great amount of business and commerce traversing it in all directions will be secured. Thus, by covering the anchorage of our squadron, the defence of Hampton roads become to a most important extent the defences of all the upper waters.

The following very important relation existing between the defences of Hampton roads and the security of both Norfolk and the navy yard, independent of closing the channel to those places, is also not generally understood, and has been overlooked by cities.

If we suppose no defences at the mouth of the roadstead, or only such as can be disregarded or easily silenced, an enemy might debark his troops in Lynnhaven bay and despatch them against Norfolk, while his fleet would pass up the harbor to the vicinity of the town, not only covering the flank of his troops, but landing parties to turn any position that might be taken by the army attempting to defend the place; or, instead of landing in the bay, he might, at his option, land the main body quite near to Norfolk, and having possession of James river, he would prevent the arrival of any succor in steamboats or otherwise by that channel.

There are two or three defiles on the route from Lynnhaven bay to Norfolk, caused by the interlocking of streams, that with the aid of field-works would possess great strength; and being occupied in succession, would undoubtedly delay, if not repulse, an enemy assailing them in front. Since the naval depot seems fixed at Gosport, these must indeed be chiefly relied on for its security from land attacks, and timely attention must be given on the breaking out of a war, to the occupying of these defiles with appropriate defences. These positions, however, possess no value whatever if they can be turned; and without adequate fortifications at the outlet of Hampton roads, there would seem to be

no security for Norfolk or the navy yard, except in the presence of a large military force.

On the completion of the defences at the mouth of Hampton roads, the circumstances will be very different. Then those defiles must be attacked in front, because no part of the enemy's force can be landed above the mouth of the roads. But this is not all. The moment an enemy advances towards Norfolk from this point of debarkation, his communication with his fleet will be jeoparded; because, as the defiles do not require a large body to defend them against an attack in front, the greater part of the reinforcements arriving from above by way of the river may be landed upon his flanks or in his rear. An offensive land movement by the enemy, under such circumstances, could be justified only in the case of his finding an entire want of preparation caused by the unexpected commencement of hostilities. In connexion with this disposition for defence, it may be expedient on the breaking out of a war, to throw up a field-work on the shore opposite the position of Fort Calhoun, which would besides contribute to the exclusion from the roadstead of vessels of small draught.

The above remarks show that the fortifications in progress are not less necessary to the security of the navy yard and the city of Norfork from a land attack than from an attack by water; and that both these important functions are superseded to the task of defending the only good roadstead of the southern coast, and of contributing in a very important degree towards the defence of the Chesapeake bay.

As in the case of Narraganset roads, it has been objected to this system of defence, that although it may shut up this anchorage, it leaves others in this region open. May we suppose, then, that if there were no other than this harbor, its defence would be justifiable? If so, it would seem that the objection rests on the principle that, in proportion as nature has been bountiful to us, we must be niggardly to ourselves; that having little, we may cherish it; but having much, we must throw all away.

The same criticism complains of the unreasonable magnitude of one of these works, (Fort Monroe,) and it is conceded that there is justice in the criticism. But it has long been too late to remedy the evil. It may not, however, be improper to avail of this opportunity to remove from the country the professional reproach attached to this error. When the system of coast defence was about to be taken up, it was thought best by the government and Congress to call from abroad a portion of that skill and science which a long course of active warfare was supposed to have supplied. Fort Monroe is one of the results of that determination. It was not easy, probably, to come down from the exaggerated scale of warfare to which Europe was then accustomed; nor for those who had been brought up where wars were often produced and always magnified by juxtaposition or proximity, to realize to what degree remoteness from belligerent nations might diminish military means and qualify military objects. Certain it is, that this experiment, costly as it was in the case of Fort Monroe, would have been much more so but for the opposition of some whose more moderate opinions had been moulded by the circumstances and wants of our own country.

The mistake is one relating to magnitude, however, not to strength. Magnitude in fortification is often a measure of strength, but not always, nor in this instance. Fort Monroe might have been as strong as it is now against a water attack, or an assault, or a siege, with one-third its present capacity, and perhaps at not more than half its cost. I do not think this work too strong for its position, nor too heavily armed; and as the force of the garrison will depend mainly on the extent of the armament, the error which has caused an excess in the first outlay will not involve much useless expense after completion.

The railroad coming down from the interior of the country to Norfolk navy yard might unquestionably render service in bringing forward troops in the

event of a powerful and persevering land attack on the defences of Norfolk and the navy yard, and in like manner useful reinforcements might arrive rapidly in the steamers of James river. But we have seen that without the defences at the mouth of the roads there would be no time nor opportunity for any such force to arrive, or to act when arrived. The enemy would proceed from sea directly up to his object, and need not necessarily lose a tide nor land a man. If a sudden attack with a large squadron of armed steamers—for this great naval depot presents an object worthy of a great expedition—is to be repelled, it will not be by crowds of volunteers rushing in from the country with muskets and rifles on their shoulders, but by fortifications of some sort, or by naval means; and if by the latter, by a force not materially less than the enemy's.

Cumberland sound, at the mouth of St. Mary's river.—It is an important principle, bearing peculiarly on the defence of the whole southern coast, that on a shore possessing few harbors it is at the same time more necessary to preserve them all for our own use, and more easy to deprive an enemy of that shelter without which a close blockade cannot be maintained. This principle is enforced in the instance of our southern coast by the two following weighty considerations, viz: first, its remoteness from the naval rendezvous, the Chesapeake, which is, on a mean, six hundred miles distant, and to leeward both as to wind and current; and second, its being close upon the larboard hand as they enter the Atlantic of the great concourse of vessels passing at all seasons through the Florida channel. While, therefore, this part of the coast, from the concentration of vessels here, is in great need of protection of some sort, naval aid can be extended to it only with difficulty, and at the risk of being cut off from all retreat by a superior enemy.

All the harbors accessible to vessels-of-war on this part of the coast will sooner or later need defences, because otherwise they will be seized by an enemy, in order, for one thing, to paralyze the valuable commerce that circulates within the rivers, sounds, and internal lateral communications. The products of a considerable portion of Georgia find outlet only by these channels. Perhaps it may require a war to demonstrate the necessity and advantage of such protection; but there are reasons already alluded to, and of much weight, for securing the mouth of Cumberland sound at any rate, independent of those just mentioned. One of these is particularly important, namely, the situation of this point with respect to the commerce flowing through the Gulf of Mexico. Every vessel bound northward from the Gulf must pass close up by Cape Cañaveral before she can bear away clear of the Matinilla reef, and hence two or three cruisers may take such positions at this outlet that all passing vessels will be seen. While we occupy Cumberland sound our own steaming or sailing cruisers can hold these posts permanently and fearlessly, assured of a place of refuge from a superior enemy.

When the best and deepest of these Georgia entrances shall be fortified, the operation of investing the coast and watching the great outlet of commerce through the Florida passage will be a difficult and hazardous one to an enemy, to whom no perseverance or skill can avail to maintain a continuous blockade, while on the part of our small vessels-of-war, steam frigates, and privateers, the same sort of supervision will be at all times easy and safe. In the meantime the fortifications of Cumberland sound alone will enable us, with the help of a floating force, to protect the whole of this part of the coast from all small expeditions, and to harass and disturb the operations of larger ones, without endangering the safety of our own cruisers.

This sound was occupied by the British during the war of 1812, and Cumberland island made headquarters, a great collateral purpose being, as it would again be, to excite the slaves to insurrection, if possible, at least to desertion.

No railroads now exist to influence in any way the security of this harbor, but both railroads and canals have been talked of, which would greatly enhance

the value of defences on the Georgia coast, and especially those of Cumberland sound.

Key West and the Tortugas.—These are the first important positions that present themselves on doubling round Cape Florida into the Gulf of Mexico.

Strong opinions have been several times expressed in favor of these fine harbors, and I beg leave particularly to refer to a letter from Commodore Rodgers to the Secretary of the Navy, July 3, 1829, (Senate documents, 1st session 21st Congress, vol. I, No. 1, page 236,) and letter from the Secretary of the Navy, March 25, 1830, (Senate documents, 1st session 21st Congress, vol. II, No. 111, page 1.)

A naval force designed to control the navigation of the Gulf could desire no better position than Key West or the Tortugas. Upon the very wayside of the only path through the Gulf, it is at the same time well situated as to all the great points therein. It overlooks Havana, Pensacola, Mobile, the mouths of the Mississippi, and both the inlet and the outlet of the Gulf.

The Tortugas harbor and that of Key West affords perfect shelter for vessels of every class, with the greatest facility of ingress and egress. And there can be no doubt that an adversary in possession of large naval means would with great advantage make them his habitual resort and his point of general rendezvous and concentration for all operations on this sea. With an enemy thus posted, the navigation of the Gulf by us would be eminently hazardous, if not impossible, and nothing but absolute naval superiority would avail anything against him. Mere military means could approach no nearer than the nearest shore of the continent. There are no harbors in the Gulf at all comparable with these that an enemy could resort to with his large vessels. To deprive him of these would, therefore, be interfering materially with any organized system of naval operations in this sea. The defence of these harbors would, however, do much more than this. It would secure to our own squadron, even should it be inferior, the use of these most valuable positions, and would afford a point of refuge to our navy and our commerce at the very spot where it would be most necessary and useful.

I forbear to enlarge on this point, merely adding that certain and complete defence will be easily secured, and that we shall thereby possess ports of refuge in the middle of the Gulf whenever we have to fly, and points of rendezvous and refreshment in the very midst of all passing vessels whenever we hold the mastery. Every vessel that crosses the Gulf of Mexico passes within sight of the two forts commenced under the sanction of Congress and now in progress, one at Tortugas, and one at Key West.

It is needless to say that with the possession of these advanced posts, and with the control of the commerce of the Gulf thereby insured, no railroads upon the main can have any relation. The forts must rely solely on their own efficiency and power of resistance. Happily the local circumstances allow these conditions to be easily secured.

I could adduce many other illustrations of the truth of the assertions made in the commencement of these remarks, that though occasional benefit will result to the system of fortification on the seaboard from the construction of railroads, they in general will have little or no bearing on the immediate means of defence. These, whether they be forts or ships, must be put in a state of preparation and kept so by the use of means that railroads do not supply, or at least that can be well supplied without them.

Numerous and facile communications, whether by railroad or steamers, or common roads, are important undoubtedly to the general activity and vigor of war, whether offensive or defensive; but it is as *communications* that they are useful, not as being of themselves instruments of warfare, or as supplying any that can be substituted for ships or forts.

I ought here to advert to the idea often announced, though always vaguely and in general terms, namely, that by the help of these railroads large bodies of men may be thrown from the interior of the country upon the exposed points of the coast, and there erect, and arm, and serve temporary batteries adequate to repel any maritime attack.

If we have waited for the opening of a war to do this, our enemy, who knows the fact as well as we, will surely not allow time for the completion even of such works as these. And in adopting this policy, we undertake to afford a protection to the country in the first days and weeks of the war, that nations experienced in warlike affairs have considered as hardly accomplished after years and years of labor during peace.

In many important cases, the contemplated batteries could not be erected hastily, because they would have to be supported by piling and grillage; and in others, even the very sites would have to be raised out of the water. The inferiority in efficacy and equipment of such batteries, when erected, would have to be compensated by an increased number of guns; but in many instances, a good defence could only be made in positions where there is not room for the requisite number of guns, except by placing them tier above tier, an arrangement wholly inconsistent with sudden preparation.

But even if the sudden arrival of a number of men brought by railroad could supply the want of duly-prepared batteries, there are important defensive points to which railroads do not approach, and are not likely to approach. And it also happens that wherever such railroads reach the coast, it is already peopled beyond all probable wants for laborers upon sea-coast batteries. If such batteries were required to be erected as speedily as possible at Boston, New York, Philadelphia, Baltimore, Charleston, Savannah, &c., they could be much sooner and better executed by calling in the laborers and mechanics of these cities, than by relying on the heterogeneous aid of regiments of volunteers and drafted militia.

The second question of the honorable Secretary is in these words: "*In what manner and to what extent the navigation of the ocean by steam, and particularly the application of steam to vessels-of-war and recent improvements in artillery and other military inventions and discoveries, affect the question?*"

And the third question, which it will be convenient to consider in connexion with the second, is in these words, namely: "*How far vessels-of-war, steam-batteries, and ordinary merchant ships and steamers, and other temporary expedients, can be relied upon as a substitute for permanent fortifications for the defence of our large seaports?*"

The application of steam to vessels-of-war acts upon the question of sea-coast defence, both beneficially and injuriously. It acts injuriously in several ways; but chiefly, first, by the suddenness and surprise with which vessels may fall upon their object, and pass from one object to another in spite of distance, climate, and season; and secondly, by their ability to navigate shallow waters.

The first property, by which squadrons may run into our harbors, outstripping all warnings of their approach, affords no chance for impromptu preparations; accordingly, whatever our preparations are to be, they should precede the war. It seems past all belief that a nation having in commission—as France and England always have—a large number of war-steamers ready for distant service in twenty-four hours, receiving their orders by telegraph, capable of uniting in squadrons, and in two or three days at most speeding on their several paths to fall upon undefended ports—it is not to be expected, I say, that they should delay such enterprises until temporary resorts could be got ready to receive them. And yet there are those who insist that we should leave defensive measures to a state of war—that we should let the day supply the need.

Inadequate as all such measures must prove, there would not be time to arrange even these. By the second property, due to their light draught of water, these vessels will oblige the defence to be extended in some form to passages,

or channels, or shoals, that before were adequately guarded by their shallowness. The bars at the mouth of the Mississippi formerly excluded all but small vessels-of-war, and the strong current of the river made the ascent of sailing-vessels exceedingly uncertain and tedious. Now these bars and currents are impediments no longer; and all the armed steamers of Great Britain and France might be formed in array in face of the city of New Orleans, before a rumor of their approach had been heard.

Had the English expedition of 1814, attended by a squadron of large armed steamers, arrived at the mouth of the Mississippi, a few transports might have been taken in tow, and in a few hours the whole army would have been before the city; or twelve or fifteen such steamers could have carried the whole army up in half a day, without the delay of transports. Will it be contended that the attack in that form would have been repulsed with the means then in General Jackson's hands? Would the landing, or even the presence on board these steamships, of the British troops have been necessary to burn the city or put it under contribution? Is there anything now but the existence of forts on the river, to prevent the success of such an attack by fifteen or twenty steamers-of-war, allured thither by the vastly increased magnitude of the spoil?

But there would have been, even then and with those means, one reason with the enemy for avoiding the channel of the river, namely, the existence, seventy miles below New Orleans, of old Fort St. Philip. I will not venture to say that in the then condition of that fort it could have repelled such an expedition, though it did very manfully resist a protracted bombardment; but I do not doubt that the existence of even that feeble work would have had weight in settling the mode and channel of approach, and in turning off the attack into circuitous and tedious avenues, and thereby gaining some time for preparation. I am confident, however, that on the completion of the repairs to that work, now well advanced, and on the completion of the exterior battery of Fort Jackson, (a new fort opposite,) no attack of that nature, even of twice the force, could penetrate by that avenue to the city of New Orleans.

The use of war-steamers against New Orleans may take another phase. If deterred by the forts above mentioned from an attack by the river, an enemy might again take the anchorage off Ship island, and transport his army, either on board steamers of light draught or in boats towed by such steamers, to the foot of Lake Borgne, whence his march to the city (a distance of twenty-eight miles through an unpeopled district) would be over one of the best roads in Louisiana.

There is nothing in the shallowness of Lake Borgne to prevent this, nor are there now any defences on the way, though it is to be hoped that the erection of a tower and battery at Proctor's Landing, which has been strongly urged for some years, and which would effectually close this aperture, will at once be ordered by Congress.

If, as during the war of 1812, it were now necessary to pass the troops from the ships to the shore by means of tow-boats, we might, perhaps, considering the augmented population of the city and environs, trust for sufficient notice and preparation to the time that must elapse before a considerable number could be landed; but with ten or fifteen light-draught war-steamers, fifteen thousand men could be landed and on their march toward the city within twenty-four hours of dropping anchor.

All other avenues to New Orleans from that quarter have, since the war of 1812, been well closed by permanent forts and batteries.

We have another illustration on the Gulf of this action of hostile steamers through shallow channels, and that may be worth adducing. Fort Morgan, at Mobile Point, defends very well the main channel into Mobile bay, and there is no other entrance for sailing vessels-of-war. But the smaller class of war-steamers would find water enough near the end of Dauphin island, and, keeping

out of reach of the guns of Fort Morgan, could pass up into the bay. They could without difficulty ascend as high as the city of Mobile, and reach that place moreover in three hours. A dozen such vessels could in that short time carry up, if they were needed, five thousand soldiers. It is surely not too much to say, therefore, that Mobile, one of our greatest depots of cotton, is by this new inlet for an enemy's cruisers, much exposed. But this is not all the danger. The large fleet of ships, often one hundred in number, and of the largest class of merchantmen, that lie for months awaiting their cargoes in the lower part of the bay, are within an hour's run of such steamers from the open Gulf, and might be destroyed either by the same expedition that ascends to Mobile or by one sent for that particular purpose.

For this and other serious consequences of leaving open this entrance to Mobile bay, the sure and the cheap remedy is the placing of a small fort at the east end of Dauphin island, a work already wisely ordered by Congress. When it is said in general that the light draught of these vessels opens avenues of attack before defended by nature, it must not be supposed that therefore it is part of the system of defence to fortify all shallow channels. Whether shallow passages will require defences or not, will depend entirely on the importance of the objects to which they give access and the power of the attack that may be directed through them, and not all on the circumstance that an enemy's steamers may enter them without difficulty.

There are a great many entrances and harbors on the coast, not shoal harbors merely, but many affording water enough for the largest vessels, that will require, if any, no other defences than such as can be prepared in time of war, because there are no objects upon these waters of a nature to provoke the cupidity of hostile cruisers: having nothing to lose in this way, they will have nothing to fear. The shallow and difficult avenues to great and valuable objects are those for which we have to provide defences in addition to defences that were necessary before the introduction of war-steamers. The danger of the Hell Gate passage to New York sufficed to keep any man-of-war from attempting to sail through, but it proves to be no impediment to steamers. The "Broad Sound" channel and also the "Gut" channel into Boston harbor are easy tracks for large steamers, though next to impracticable to line-of-battle ships and frigates; and so with other channels and other places.

In considering to what extent the introduction of steamers into war service may help the coast defence of the country, should we assume that we ought to rely upon them to repel the enemy's steamers, so dangerous in coming without warning and penetrating promptly through all natural obstacles up to the vital points of the coast, we should commit a very great error, though it is perhaps a natural one on a cursory examination, as it certainly is a frequent one. It would be a fatal error if practiced upon by a nation having more than one or two important ports, and even with such nation it would be the most expensive of all resorts.

This cannot be a safe reliance with war-steamers any more than with sailing vessels-of-war, and a few words may make this clear.

I do not assert that armed vessels would not be useful in coast defence. Such an idea would be absurd. I shall even have occasion to show a necessity for this kind of force in certain exceptional cases. It is the general proposition, viz: that armed vessels and not fortifications are the proper defences for our vulnerable points—a proposition the more dangerous because seemingly in such accordance with the well-tried prowess and heroic achievements of the navy that we have now to controvert.

Boston, New York, Philadelphia, Baltimore, Charleston, and New Orleans are, we will suppose, to be guarded, not by forts, but by those vessels, on the occurrence of a war with a nation possessing large naval means. We know that it is no effort for such nations to despatch a fleet of twenty line-of-battle

ships and frigates, or an equal number of war-steamers, or even the combined mass, both fleets in one.

The United Service Journal shows that in the month of August last Great Britain had actually in commission in their navy, in a time of profound peace, thirty-eight line-of-battle-ships and frigates, thirteen sloops-of-war, and upwards of fifty smaller armed sailing vessels, together with forty-eight armed war-steamers and near forty unarmed steamers.

What, then, shall we do at the above-named ports severally? Each is justly felt to be an object worthy of an enemy's efforts, and each would be culpable in sending elsewhere any part of the force required for its own defence. Each, therefore, maintains a naval force equal at least to that the enemy is judged to be able to send promptly against it. Omitting any provision for other places scarcely less important, what is the result? It is that we maintain within the harbors of, or at the entrance to, these places, chained down to this passive defence, a force at least six times as large as that of the enemy.

He does not hesitate to leave his port, because it will be protected in his absence by its fortifications, which also will afford him a sure refuge on his return. He sails about the ocean depredating upon our commerce with his privateers and small cruisers, putting our small places to ransom, and in other ways following up appropriate duties, all which is accomplished without risk, because our fleet, although of enormous magnitude, must cling to ports which have no other defence than that afforded by their presence. They cannot combine against him nor attack him singly, for they cannot know where he is, and must not, moreover, abandon the objects which they were provided expressly to guard.

It would really seem that there could not be a more impolitic, inefficient, and dangerous system, as there certainly could not be a more expensive one.

A navy, whether of war steamers or sailing vessels, should be aggressive in its action. It should, by carrying the war into the seas and upon the coast of the enemy, direct its calamities from our coast and commerce; but the system we are now considering involves the absurdity of relinquishing all the incalculable advantages of mastery upon the ocean to an enemy who nevertheless may possess but a sixth of our naval power.

To bring other means even in partial substitution for this defence by ships and steamers, or to give it local auxiliary aid, by way of reducing its inordinate magnitude, would be to confess its inappropriateness for harbor defence. We know that other comparatively cheap means may be substituted, but this is just what the proposition denied. Naval means would be *useful* undoubtedly. The question is whether they would be *sufficient;* and we see some of the consequences of making them sufficient. We come thus to examine the defensive arrangements that can be made in aid of or substituted for armed sea-going vessels.

These arrangements may be of two classes, namely: first, fixed forts and batteries on the land, and in some cases movable batteries of heavy guns; and second, upon the water-floating batteries of all kinds, gunboats, etc., fixed or movable.

There are doubtless situations where it may be necessary for us to present a defensive array, at the same time that to do so by fortifications alone would be impracticable; and it is not therefore prejudging the question we are about to examine. It is neither underrating fortifications nor everrating floating defences to say that these last are some or all of them indispensable in such positions.

Any very broad water, where deep soundings may be carried at a distance from the shores, greater than effective gun range, and where no insular spot, natural or artificial, can be found or formed nearer the track of ships, will present such a situation; and we may take some of our great bays as examples.

Broad sounds and wide roadsteads affording secure anchorage beyond good

gun range from the shores will afford examples of another sort, and harbors with very wide entrances and large surface exhibit examples of still another kind.

As in all such cases fortifications alone will be ineffectual, and nevertheless recourse to defences of some sort may be unavoidable, it has not failed to be a recommendation in the several reports on the defence of the coast since 1818, that there should be a suitable and timely provision of appropriate floating defences. And until the invention of man shall have caused an entire revolution in the nature of maritime attack and defence, these or kindred means must be resorted to, not however, because they are means intrinsically good or suitable under like circumstances, but because they are the only means applicable to such cases. In the circumstances just referred to there is no alternative, and therefore no point to be discussed. The remaining question is, whether these floating defences are to be relied on in cases that admit of defence by fortifications.

And first, as to gunboats. Although of undoubted use in peculiar circumstances, it will hardly be contended that gunboats afford a safe reliance in harbors that can be entered by vessels of magnitude. Ships becalmed or aground might be sorely harassed, if not destroyed by a spirited attack from this force, and there are other situations wherein it would be very effective. But harbors defended by gunboats will not be attacked in calms nor in adverse winds, and it is not easy to believe that any probable array of these crafts would impede or hinder for a moment the advance of a hostile fleet. Nelson, at Trafalgar, bore down in two divisions upon the combined fleet, each division being exposed to a raking fire; and although suffering considerably from that fire, he was able, notwithstanding, to break the hostile line and defeat his superior adversary. What, comparatively, with the raking fire of the combined fleet, would be the fire of a fleet of gunboats? Opposing no effectual obstacle to approach or entrance, these small vessels, scattered and driven upon the shoals, could be kept by the broadside of a few active vessels at too great a distance to produce any serious effect upon the main attack by their desultory fire.

Although they might afford useful means of annoyance during a protracted occupation by the enemy of harbors containing extensive shoal grounds, and shallow bays and inlets, they would be nearly useless in resisting the first assault and in preventing the brief operation of levying contributions, or burning or spoiling national establishments.

The true reason of this defence must not, however, be misunderstood. It is not that the boats do not carry guns enough or men enough for the object, but it is because, from the comparative weakness of the vessels, the guns and the men cannot be kept in an effective position.

There are, moreover, many harbors requiring defence, in which there are no shoals whereon the boats could take refuge; and in such their capture or destruction would be inevitable should there be, at the same time, no river up which they might fly, or lateral issue through which they could escape to a safe distance.

Floating batteries, of which a good use might be sometimes made in peculiar situations, would, I suppose, differ from gunboats, in being larger, containing many guns each, and in being stronger; that is to say, having thicker sides or bulwarks; and it has sometimes even been proposed to construct them with ball-proof parapets, and with platforms open above—like, in these respects, batteries upon the shore. But in whatever way formed, it is necessarily a part of the idea that they be strong and massive; and, consequently, that they be unwieldy, incapable of sudden change of place, and incapacitated either to advance upon a defeated foe or to evade a victorious one. We are now, of course, speaking of batteries moved by steam. Being denied the power of locomotion, at least for any purpose of manœuvring in face of the enemy, we are to consider these batteries as moored in position, and awaiting his advance. Should the batteries be large, requiring deep water to float them, or should they be placed

across or near the channel, for the sake of proximity to the track of ships, the enemy would engage them at close quarters. All advantages of mobility—of concentrating his whole fleet upon one or two points, to which, under these circumstances, no relief can be sent—of greater elevation and command, would be on the side of the assailant, with no counteracting advantage to the batteries, but greater thickness of bulwarks. Whether this excess of thickness should be considered a material advantage, since the introduction of large bomb-cannon into the armament of ships, is a very doubtful matter. The batteries if anchored across the channel would have the further advantage of a raking fire; but we have seen that the raking fire of one squadron of ships upon another advancing is by no means decisive. The power of throwing the whole assailing force upon one or two points, of pouring upon the decks of the batteries a greatly superior force of boarders, would, of themselves, seem to leave little room to doubt as to the issue.

If, now, we suppose these floating batteries to be smaller, so that having a lighter draught they might be placed near the shores or upon the shoals, they might certainly be thereby saved from the kind of attack which would prove so fatal if anchored more boldly in deep water; but they would at the same time lose much of their efficiency from their remoteness; and positions wherein they would be secure from being laid alongside, while they would be in a proper attitude to contribute materially to the defence of the harbor, are afforded but rarely. It is doubtful whether, as a general rule, these smaller floating batteries, notwithstanding their greater capacity of endurance, would afford a better defence, gun for gun, than gunboats; or, in other words, whether this capability of endurance in the one would be more than a compensation for the power of locomotion in the other. But whether near the shore or in the channel, whether large or small this description of defence, owing to its fixedness connected with the destructibility of the material of which it must be made, will be exposed to attacks analogous to those made by gunboats on ships aground. The enemy knowing of what the defensive arrangements consist, will come provided with the requisite number of sailing or steam vessels armed with bomb-cannon, against which the thicker bulwarks of the floating batteries would avail nothing. He would, besides, hardly fail to provide himself with bomb-ketches armed with heavy sea mortars; and as there could be no guarding against the effects of the long ranges of these, a few such vessels would, with great certainty, constrain the floating batteries to quit their position, abandoning every disposition approaching to a concentrated array. Not to mention other modes of attack, which would seem to leave the chances of success with the enemy, it will be noticed that this kind of defence, whether by gunboats or floating batteries, has the same intrinsic fault that an inactive defence by the navy proper has; that is to say, the enemy has it in his power to bring to the attack a force of the same nature and at least as efficacious as that relied on for defence; hence the necessity not of mere quality, but of *superiority* on the part of the defence at every point liable to be attacked; and hence also the necessity of having an aggregate force as many times larger than that disposable by the enemy, as we have important places to guard. Should we, for example, have ten such places, and the enemy threaten us with twenty ships of the line, we must have, in all these places, an aggregate of gunboats and floating batteries more than equivalent to two hundred ships-of-the-line; for it will hardly be contended that these defences can be transported from one place to another as they may be respectively in danger.

But what will be the relative state of the parties if, instead of gunboats or floating batteries, we resort to steam batteries.

Although much has been said of late of the great advantage that defence is to derive from this description of force, I have not been able to discover the advantages; nor do I see that sea-coast defence has been benefited in any particular

by the recent improvements in steam vessels, except that in the case before adverted to, where from the breadth of the waters defence from the shore would be unavailing, a more active and formidable floating defence than by gunboats and floating batteries is provided.

It must be remembered that by far the greatest improvement in steam vessels consists in having adapted them to ocean navigation; and one inevitable consequence of this improvement will be, that if the defence of harbors by steam batteries be regarded as securing them from the attacks of ships-of-the-line and frigates, or at least of placing the defence quite above that kind of attack, they will no longer be attacked by sailing vessels, but by steam vessels similar in all warlike properties to those relied on for defence.

Not only is there no impediments to transferring these vessels across the ocean, but the rapidity and certainty of these transfers are such as to enjoin a state of the most perfect readiness everywhere and at all times; and also a complete independence of arrangement at each particular point, both the state of preparation and the independence of arrangement being much more important than when the enemy's motions were governed by the uncertain favor of winds and weather.

It is not easy to conceive of any important properties belonging to steam batteries acting defensively, that the attacking steam vessels may not bring with them, or at least may not have imparted to them on their arrival upon the coast, unless it should be thought proper to give to the former a greater thickness of bulwark than would be admissible in sea-going vessels.

But the peculiar advantage conferred by steam lies in the faculty of moving with promptitude and rapidity, and any attempts to strengthen the harbor vessels by thickening their bulwarks considerably would unavoidably lessen their mobility, thereby partially neutralizing the advantage sought. At the same time it is extremely doubtful whether any benefit would be derived from the thicker sides. It is probable that the best kind of bulwarks for these vessels *and all others*, is that which will be just proof against grape and canister-shot fired from moderate distances, because with such bulwarks a shell fired from a bomb-cannon within a reasonable distance would pierce both sides, that is to say, would go in one side of the ship and out at the opposite side, producing no greater effect than a solid shot of the same calibre, while with thickened sides every shell would lodge in the timbers and produce terrible ravages by bursting.

In the practice with these missiles in this country it has been found difficult to lodge a shell in thin targets, even when the load of the gun was so reduced as to increase materially the uncertainty of aim. As it is probable, therefore, that the protection from solid shot afforded by massive bulwarks would be more than counterbalanced by the greater injury horizontal shells would inflict by means of these bulwarks, we may conclude that the harbor steam battery will not differ in this respect materially from the attacking steam ships; and if they do differ in having more solid and impervious bulwarks, that no advantage over the enemy will result therefrom.

We come therefore to the same result as when considering the application of the other kinds of floating force to the defence of harbors; and this result is, that there is no way of placing the coast in a condition of reasonable security but by having at any point the enemy may happen to select a force in perfect readiness, which shall be superior to that brought to the attack.

There not only prevails the idea that we ought to rely upon these floating defences, but also the idea that we may postpone the fitting them for service till the commencement of war. Turning again to the six ports before mentioned, our whole peace navy that may happen to be in port and ready for use, being appropriated to local defence in its several stations, immense additions would have to be made at each port; and whether these additions were to be supplied from the ship-yards or by conversion of merchant vessels and service steamers

into floating batteries, a considerable time must necessarily elapse before there could be anything like readiness. In the meantime the enemy, sending a small squadron of war steamers against each—nothing being ready large squadrons would not be needed—would nip all preparations in the bud. We have to keep in mind a fundamental principle of this system, which is, not to incur the expense of preparation till the certainty of war has arrived, or, as it might be phrased, till there will no longer be time to prepare.

I should not have gone so much at length into a branch of one subject wherein the general conclusion appears to be so obvious and incontrovertible but for the prevalence of opinions which I consider not erroneous merely but highly dangerous, and which, I think, must give way before a full exhibition of the truth. I do not anticipate any formidable objections to the positions assumed, nor to the illustrations; but even should all these in the form presented be objected to, I may still challenge opposition to the following broad propositions, namely:

1st. If the sea-coast is to be defended by naval means exclusively, the defensive force at each point deemed worthy of protection must be at least equal *in power* to the attacking force.

2d. As from the nature of the case there can be no reason for expecting an attack on one of these points rather than on another, and no time for transferring our state of preparation from one to another after an attack has been declared, each of them must have assigned to it the requisite means; and

3d. Consequently this system demands a power in the defence as many times greater than that in the attack as there are points to be covered.

Believing that a well-digested system of fortification will save the country from the danger attending every form of defence by naval means, and the intolerable expense of a full provision of these means, I will now endeavor to show that such a system is worthy of all reliance.

There has been but one practice among nations as to the defence of ports and harbors, and that has been a resort to fortifications. All the experience that history exhibits is on one side only—it is the opposition of forts or other works comprehended by the term fortification to attacks by vessels; and although history affords some instances wherein this defence has not availed, we see that the resort is still the same. No nation omits covering the exposed points upon her seaboard with fortifications, nor hesitates in confiding in them.

But it has been asserted, in a way to convey incorrect and hurtful impressions to the country, that fortifications for such purposes are obsolete resorts; that the improvements in the instruments and appliances of war within late years have caused the abandonment of such reliances. This, however, is far from being true; and it is quite important in respect to the quarters whence such assertions have sometimes proceeded not only to sustain but to enforce this denial.

If considerable additions have not been made lately to the defences of many well-known European harbors, it is because they were fully fortified long ago. And it might here be asked in passing what would have happened to the seaports of France during the long wars between her and Great Britian, and with such naval supremacy in the hands of the latter, if the French ports had not been well forfeited? Can it be supposed that anything but these fortifications kept the English out of the great ports and naval depots of France, and permitted large fleets to grow, great expeditions to mature, flotillas to manœuvre, under the eyes of the blockading squadron and almost within reach of its guns?

But it happens that even in well-fortified France any improvement or change in a harbor that affords opportunity and place for new defences is sure to produce them; the Cherbourg breakwater, a work of late years, is supplied with formidable batteries, perhaps even now not quite finished.

It happens, moreover, that in Great Britain, which of all the nations of the

earth has most reason to rely for defence on naval power, fortifications are the reliance for habor defence, and of late years particularly.

The application of steam to ocean navigation has done much and is likely to do more to lessen the naval ascendancy of that power, and the ports which formerly found security in rather indifferent fortifications under the overwhelming numbers of her men-of-war, have, in the present liability to be surprised by fleets of war-steamers, received and are at this moment receiving large additions of strength in forts and batteries, and new "harbors of refuge" are being formed and strongly fortified, in order the better to protect her coast and her commerce under this change of naval relations.

Great Britain sees that she cannot effectually guard her coast and her ports from this particular danger by the number of her war vessels, great as this number is, and greatly as it may be augmented from her vast commercial marine. She does not run into the folly of posting at every dock yard a squadron of steamers as large as any that can be brought against it, but she improves and adds to her old fortifications to make them adequate of themselves, and she creates new (artificial) harbors for the sake of having fortified shelter near the probable field of activity of her navy in its various forms.

Instead, therefore, of lessening the utility of fortifications, we see that, in the opinion of the high military authorities of that government, the late changes and improvements have made the increase and improvement of fortifications indispensable. There are some particulars of her late course in this respect.

Referring to parliamentary estimates for 1847–'48, 1848'–49, and 1849–'50. I find that for fortification alone, *including new works and repairs of old works* upon the coast of Great Britain and Ireland, (chiefly along the English channel,) and *excluding estimates for barracks, quarters, storehouses, &c.*, there was demanded for those years, severally, $578,766, $282,892, and $439,036, being $1,300,694 for the last three years.

I find that important colonial ports have received accessions of strength in the same way lately, and that, for example, on the water front of the redoubtable Gibraltar the same batteries that repelled and destroyed the formidable floating batteries of France and Spain in 1782, expenditures exceeding six hundred thousand dollars have been made within four or five years, and $367,887 more are estimated to be necessary to put them in equilibrium with new means of attack.

At Malta, already possessed of very strong fortifications, about $180,000 have already been voted, and $696,000 is called for in addition, to be applied to harbor defences particularly.

The same nation is meanwhile placing in her new coast batteries eight-inch and fifty-six pounders, and thirty-two pound guns; and, at a great expense, is substituting this heaviest kind of ordnance for twenty-four pounders and eighteen pounders in the old batteries. Between the years 1839 and 1849 she has supplied, or has issued orders to supply, to sea-coast fortifications at least two thousand new pieces of the largest calibre. The increase of heavy ordnance in the batteries of Gibraltar within that period, was eighty-two pieces; and at Portsmouth and vicinity it was two hundred and eighty-seven pieces.

Sir Thomas Hastings, of the *Royal Navy*, under examination before a committee of the House of Commons, said: "I was asked just now whether the guns at Portsmouth or other places had been fired in anger. I should be glad to bring under the consideration of the committee that the introduction of steam makes it much more possible now to make attacks upon any certain points. From the different points all along the channel a concentration may be made of a very large body of steamers, and under such circumstances an equipment," (he is speaking of sea-coast batteries,) "which would have answered very well when you had only incidental attacks to contemplate from sailing vessels, might be insufficient when you could bring twenty-five or thirty vessels carrying the

heaviest possible guns to bear upon your works. I will take, for example, if you will permit me, the port of Falmouth. In the event of any war occurring with this country the probability is, being the most western port, it would become the refuge of our merchantmen running into the channel to avoid privateers and steamships. If that port were left in its present state it is clear that ten powerful steamers might destroy everything in it, without any material injury to the assailants."

In answer to the question whether, in his opinion, the merchant steamers would be as available for the defence of the coasts as war steamers, he said: "Certainly not; I think this country (England) would derive an immense power from her merchant marine; but I look upon it to propose to contend with merchant steamers against the *powerful vessels which are in existence in France* would be a very unwise thing."

In April, 1850, the Hon. Colonel Anson, in explaining the ordnance estimate to the House of Commons, said, in reference to the estimates for "*works, buildings, and repairs*": "The whole of this vote had been most carefully considered by the master general of the ordnance and her Majesty's government; and though large in amount, the house would see how small a sum was asked for new works, such as fortifications, &c., either at home or abroad. That reduction was, however, attributable to the large amount that had been spent on those works in previous years. It was needless for him now to point out to how low a state, he might say, indeed, to what a state of degradation our works of defence had fallen till within the last few years, and in what condition the means we possessed of protecting our shores from aggression and insult were in 1835. It was enough to say they were totally inadequate for the purpose. They remained nearly in the same state till 1845, and were in the very lowest possible condition in that year. But, in the meantime, the state of things had not escaped the observation of those who turned their attention to our relations with foreign powers, and many honorable gentlemen found fault with the government for not providing more effectually for the defence of the country. In 1845 the aspect of affairs became threatening; the few fortifications we had to rely upon dismantled, dilapidated, and decayed. If a squadron of steamers had chosen to make their way to any of our principal naval stations, either Portsmouth, Plymouth, or Pembroke, or up the Thames, they were completely open to attack, and an enemy might have committed any act of aggression he pleased. There was nothing to prevent his vessel coming up the Thames and insulting her Majesty in the very heart of her dominions. These considerations pressed themselves so seriously at the time that the attention of the right honorable member for Tamworth and the existing government were called to it, and they at once set to work to remedy the neglect. They proposed that a sum of money should be set apart to improve our defences, and their example had been followed by the present government to a very considerable extent. The result was, that very much had been accomplished during those four years, and he was happy to say the country might be proud of it. At Portsmouth the sea defences had been completed and made very powerful; at Plymouth they were equally complete, and he believed great improvements had taken place at Sheerness, and in the defences on the Thames. They had commenced similar works at Pembroke, which was one of the finest dock yards and harbors in the world, and he was sure the house would be prepared to meet any reasonable demand upon them for its defence. It was impossible to say what might come to pass in a few years, and though the expense might appear to be large now, when the house considered the ultimate advantage to the country from the state and the feeling of security against aggression, they would, he was certain, agree with him that it far out-balanced any temporary inconvenience from the grant of so much money."

An English officer of rank and distinction discussing, in 1849, the system of

defence necessary to Great Britain, after recommending large inland fortifications to be erected against the possible march of an enemy's army upon London, estimates that it will require £1,500,000 ($6,600,000) to complete existing fortifications *upon the coast*, including new batteries to be constructed there, and to supply them with artillery and stores. That is to say, in his opinion, the sum of $6,600,000, in addition to what had within these few years been expended, was necessary to be applied to the *coast de'ences* of that country, in consequence of the changes lately introduced into the means of carrying on war from the ocean.

When I had advanced thus far in this report, and was still seeking facts in illustration of the course pursued by Great Britain, I met the following summary of remarks made in relation to fortifications by Mr. Pitt, sixty-five years ago, (1786.) The principles for which he then contended are now and ever must be as sound and as applicable as when he pressed them on the consideration of parliament with so much earnestness. The only change is one of degree. And we have just seen that the statesmen and military men of that country, at the present day, take the same view and press the same policy. During the wars of the French revolution the vast naval superiority of England enabled her to hold the closest blockade of all the ports of her adversary. This crippled French naval enterprise in a twofold manner—by shutting up the commerce which alone could supply seamen, and by shutting up the few war vessels that they were able to man. But even then, with such little apparent cause to fear anything from that navy, large sums were expended by England upon new seacoast ports, towers, and batteries. Now, when France can suddenly send out large squadrons of steam war vessels in spite of the strictest blockade, Great Britain feels the need of still greater strength at home. But it is we see always on fortifications that England relies for the safety of her ports; in no case do we see her resorting to a parade of war vessels within or at the entrance to her ports. Where her largest assemblages of men-of-war of all sorts take place, and where there must at all times be a considerable number, there she places, not small batteries and insignificant forts and towers, but her strongest and heaviest fortifications. Her history demonstrates that she knows how to employ her fleets better than keeping them moored within her harbors and roadsteads.

In urging upon the House of Commons, in 1786, certain propositions in relation to fortifications, Mr. Pitt, "to prove the utility of fortifications, appealed to the unfortunate and calamitous situation in which we were placed in the late war. A considerable part of our fleet was confined to our ports in order to protect our dockyards, and thus we were obliged to do what Great Britain had never done before—to carry on a defensive war—a war in which we were under the necessity of wasting our resources and impairing our strength, without any prospect of and possible benefit by which to mitigate our distress. Mr. Pitt felt the question to be a portion of that momentous system which challenged, from its nature, the vigilance and support of every administration." * *

* "Was the House ready to stand responsible to posterity for a repetition of similar misfortunes and disgrace? Were they willing to take upon themselves the hazard of transmitting the dangers and calamities which they themselves so bitterly experienced?" * * * "Mr. Pitt observed that there was a consideration which ought to have more weight than others, and this was, that fortifications, being calculated to afford complete security to dockyards, would enable our fleets to go on remote services, and carry on the operations of war at a distance, without exposing the materials and seed of future navies to destruction by the invasion of an enemy." * * *

"But it was not only by foreign expeditions that we might lose the aid of our fleet; in case of invasions it might so happen that the ships, though in the

very channel, might be prevented by contrary winds, tides, and other contingencies, from arriving to the assistance and relief of the dockyards."

"Were it to be asked why the sum to be required by these fortifications had not been demanded for strengthening the navy, he would fairly answer that the money which would prove sufficient to accomplish these works would not build so many ships as would serve for the defence of our most valuable harbors. There was, besides, a certain degree beyond which we could neither build nor man any more. The true limit he could not, nor would it be prudent for him to assign, yet in the nature of things such a limit must exist; but there could never be any line drawn to restrain the security which we ought to provide for our dockyards."

"Mr. Pitt called upon the House to beware how they suffered themselves lightly to be drawn into a line of conduct which might involve their posterity in accumulated evils; and he suggested to their recollection the remorse which they must feel if they should hereafter find that they had, by an ill-timed pertinacity upon the present occasion, brought upon the country calamity and ruin."

I regret that I have not time to find and adduce a few pertinent facts from the practice of the French nation in this respect, and especially within the last few years. We know well, however, the general result, namely, that France has always kept herself well guarded by sea-coast fortifications; and, as before said, that she owes her exemption from many heavy calamities to a steady adherence to that policy.

Believing that the statements just presented must conclusively show that nations having experience in war have made fortifications their main reliance for the defence of their ports, reserving their navies for offensive purposes, and that the greater energy and activity imparted to the latter by modern improvements have compelled a still more powerful preparation of such defences, I turn again to the particular point of our present inquiry, namely, the use and influence of steamers in coast defences. I have to add, that steamers as substitutes for fortifications would be inferior to other armed vessels, because the efficiency of the defence must depend, other things equal, on the number of guns; that is, as a large number will be brought to the attack, a large number must be employed in defence, and steamers carry very few in comparison. The power of rapid locomotion characteristic of steamers, is for this purpose nothing in itself, nor the power of transporting quickly bodies of armed men; there must be the power of heavy and numerous guns, whether moving or anchored. Though very useful in reconnoitering an advancing enemy, in carrying orders, in conveying relief to batteries, in transporting quickly large bodies of men, and in such like duties, steamers could not constitute a good defensive array except against steamers only; and, accordingly, against such an array the enemy's fleet of steamers would bring in tow a few line-of-battle ships or frigates.

Even, therefore, should there be time after a war shall have been opened to prepare in each of the great harbors a hurried display of this kind out of the light river and bay steamers, it would be no match for sea-going steamers and heavy armed vessels brought into the attack; indeed, it would not be easy to say what excess of numbers, in favor of the defence, could establish an equalibrium. As just said above, there could be no resistance of moment made, except by many heavy guns; and to supply these a great multitude of steamers or of merchant ships would have to be converted into floating batteries. What the result of such a resort would be may be learned from the battle of Copenhagen.

This was in no sense a contest between ships and fortifications, as is generally supposed; it was the attack of a fleet of sailing ships upon a line of floating batteries of one kind or another. The Danes had anchored on the edge of a shoal a line of these batteries, parallel nearly with the wall of the city, and at the distance of at least three-fourths of a mile. This line could be attacked

only on the outside, and, when attacked, was interposed between the enemy and the walls, and consequently for the time entirely extinguished the fire from the fortifications.

The line consisted of *block-ships* and *praams*—by which are understood to be meant vessels converted into mere floating batteries and more or less strengthened for the purpose; and *rafts*, supposed to be floats of timber with a timber parapet towards the enemy—in all eighteen batteries. A squadron of four sails of the line, one frigate and two sloops-of-war, were anchored higher up the harbor—where there was also the "three-crown" battery. Lord Nelson carried to the attack twelve line-of-battle ships, twelve frigates, and a number of smaller armed vessels. All this force he concentrated upon the line of floating batteries; every vessel of which was taken or destroyed, except one or two smaller vessels, which cut their moorings and ran in under shelter of the fortification. This concentration included the Danish squadron above mentioned, and also the "three-crown" battery from any material participation in the action. Some English frigates within reach of the latter were greatly injured and obliged to retreat.

This faculty of concentration (applied with success on several memorable occasions by that great naval commander) is an inherent one in an attacking squadron, and is not to be evaded by a line at anchor—especially not by a line of floating batteries.

If, however, we should allow batteries of this sort whether aided by steam or not—to be equal, gun for gun, to the attacking squadron, and that they can be got ready in time, we nevertheless should thereby throw an enormous expenditure of money upon the country at a moment of great fiscal difficulty. Let us make a rough estimate of that expenditure.

Lord Nelson's fleet, just mentioned, was rated at 1,158 guns, and it is only reasonable to assume that we should be liable to a visit from a force as great. Assuming that the merchant vessels taken for conversion into floating batteries, would, on the average, carry ten guns on a broadside, which will be assuming that they are as large as sloops-of-war, we should need fifty-eight such vessels; and estimating these at fifty thousand dollars each, which, including purchase, armament, alteration, &c., is a moderate allowance, we shall have a total first cost of two million nine hundred thousand dollars for one part, and for the six ports before mentioned, a grand total of seventeen million four hundred thousand dollars—a sum much greater than has been expended in preparing for more than four thousand of the heaviest guns in permanent fortifications upon the great points of the coast.

If we attempt to supply the requisite force in guns by the use of river and bay steamers, instead of sailing vessels, we cannot allow more than five guns in the average, to a broadside; so that we shall require one hundred and sixteen steamers, which, at thirty thousand dollars for purchase, armament and alteration, will give three million four hundred and eighty thousand dollars, for the first cost in a single harbor, and for the six ports, twenty million eight hundred and eighty thousand dollars.

I do not give these estimates as exact, though I believe them to be below the cost that would have to be incurred, but as affording hints of the costliness of provisions of that nature. An expenditure for this purpose, equally great, would have to be repeated, moreover, at the commencement of every war, or still greater outlays would be incurred in keeping up this perishable armament during peace.

What conclusions follow from the preceding considerations? Why, that in adopting this expedient, we should involve ourselves, at the opening of every war, in a vast outlay for the defence of these ports; that there would be great probability that the preparations, although involving that enormous expense, could not be made in time; that, even if prepared in time, everything would be

put at the hazard of a single battle, with most important advantages on the side of the enemy, and consequently few probabilities of successful resistance; or if, by more extended preparations, we should endeavor to turn these probabilities the other way, it would be at the greater risk of not being ready, and with the certainty of greatly enhanced cost.

It has been deemed necessary above all things, considering impressions that have been made on the public mind as to the influence of steam vessels upon sea-coast defence, to show at large that while the introduction of the vessels into naval equipment has greatly facilitated attacks, either by steamers alone or in conjunction with sailing vessels, it has done more to avert or repel them, leaving fortifications, which these vessels can in no case replace but at great disadvantage, more indispensable than ever.

In my desire to convey my own strong convictions, I am conscious that I have tediously prolonged this part of the report.

Although what has been said above is undoubtedly true in reference to steamers or other floating defences as substitutes for fortifications, there remain important functions in defence, which must be committed to floating defences of some kind, as has before been fully set forth; and in some of these cases it is quite certain that steam batteries may, of all floating defences, be the most suitable.

It must not be forgotten, however, that the very qualities which recommend this particular kind of force, will equally characterize the steam vessel of the enemy, and that whether steam vessels or sailing vessels, or both, are relied on, unless there are well-secured points on the shore under which they can take refuge, they will themselves constitute an inviting object to a superior force of the enemy.

If, for example, we were to deem one of our open waters of such importance as to assign eight or ten steam batteries for its protection, we should thereby place within the reach of the enemy an object worthy of the efforts of a squadron of twelve or fifteen vessels of the same description. Even, therefore, instances where these naval means must be resorted to for defence upon the water, there must be works at hand upon the shore, to the shelter of which, if likely to be overpowered, they can retire.

A branch of the second question, namely, that portion which inquires, "In what manner recent improvements in artillery and other military inventions and discoveries affect this question," require some separate remarks.

The only invention and discovery, so far as I am aware, that can affect this question, one way or the other, is that which has introduced the practice of firing shells from guns; and which has involved the use of guns of comparatively large calibre, so that guns which discharge missiles of eight-inch and ten-inch diameter, are rather extensively used, especially eight-inch guns. Even guns of twelve-inch bore have been made in this country, and I believe also in other countries.

It is of course understood that even larger shells than these were long ago thrown in the attack and defence of fortified places, from the mortars of land batteries and bomb ketches. The shells now spoken about, instead of being projected under a high angle, as from mortars, are discharged from guns at low angles, or nearly horizontally, like solid shot; these guns of large calibre being often called Paixhan guns, after the French officer who first succeeded in securing the favor of the military authorities for the idea—the idea having been suggested long before, and even successfully tried.

These shell-guns are now introduced by maritime nations in all vessels-of-war, whether sailing vessels or steamers. Those latter vessels, which carry but few guns in number, are much augmented in power by their introduction, but not more so than sailing vessels, to which these guns are equally appropriate; and I have no doubt that their numbers will be every day increased, until perhaps there will be few or no armed sailing or steaming ships of which the guns will

not be modified in their calibre for this purpose, and provided with shells as well as shot.

As to the injury sustained from an enemy's shells, that will undoubtedly be more serious in steamers than in sailing vessels, because, in addition to all the liabilities to injury that belong, inherently, to vessels of all kinds, there are several superadded by the machinery, the wheels, the boilers, &c., of steamers. In contests between vessels, whether sailing or steam vessels, the effects of shell-guns will no doubt be very destructive on both sides; but between forts and ships, the peculiar injury inflicted by shells will be suffered by the vessel excluclusively. The fort will suffer less from hollow shot than from solid shot. This, though true beyond all question or caviling, may need a few words of explanation.

How are the batteries to be affected by them? It can be but in two ways: first, the ship's gun having been pointed so as to strike a vital point—that is to say, a gun or a carriage—the shell may explode at the instant of contact. This explosion may possibly happen thus opportunely, but it would happen against all chances; and if happening, would probably do no more than add a few men to the list of killed and wounded. For reasons that will soon appear, it is to be doubted whether the probability of dismounting the gun would be so great as if the missile were a solid thirty-two pound shot. Secondly, if it be not by dismounting the guns or killing the garrison, the effects anticipated from these missiles must result from the injury they do the battery itself. Now we are perfectly informed by military experience as to the effects of these shells upon forts and batteries; for the shells are not new, although the guns may be so; the eight-inch and the ten-inch shells having always been supplied in abundance to every siege train, and being perfectly understood, both as to their effects and the mode of using them. Were it a thing easily done, the blowing away of the parapets of a work (a very desirable result to the attacking party) would be a common incident in the attacks of fortifications; but the history of attacks by land or water affords no such instance. The only practicable way yet discovered of demolishing a fortification, being by attaching a mine to the foot of the wall; or by dint of solid shot and heavy charges fired intermittingly, during a long succession of hours, upon the same part of the wall, in order not only to break through it, but to break through it in such a manner that the weight and pressure of the incumbent mass may throw large portions of the wall prostrate. This, the shortest and best way of breaking a wall, requires, in the first place, perfect accuracy of direction; because the same number of shots that being distributed over the expanse of a wall would merely peel off the face, would, if concentrated in a single deep cut, cause the wall to fall; and it requires, moreover, great power of penetration in the missile—the charge of a breeching gun being, for that reason, one-third greater than the common service charge. Now the requisite precision of firing for this effect is wholly unattainable in vessels, whether shot be solid or hollow; and if it were attainable, hollow shot would be entirely useless for the purpose, because every one of them would break to pieces against the wall, even when fired with a charge much less than the common service charge. This is no newly discovered fact; it is neither new nor doubtful. Every hollow shot thrown against the wall of a fort or battery, if fired with a velocity affording any penetration, will unquestionably be broken into fragments by the shock.

After so much had been erroneously said about the effect of these shells upon the castle of San Juan d'Ulloa, it was deemed advisable, although the result of European experiments were perfectly well known, to repeat, in our own service, some trials touching this point. A target was therefore constructed, having one-third part of the length formed of granite, one-third of bricks, and the remaining third of freestone. This was fired at by a Paixhan gun, and by a thirty-two pounder, from the distance of half a mile, and the anticipated results were obtained, namely:

1st. Whether it was the granite, the brick, or the freestone that was struck, the solid thirty-two pound shot penetrated much deeper into the wall, and did much more damage than the eight-inch hollow shot; and, 2d. These last broke against the wall in every instance that the charge of the gun was sufficient to give them *any* penetration.

The rupture of the shell may often cause the explosion of the powder it contains, because the shell, the burning fuse, and the powder are all crushed up together; but the shell having no penetration, no greater injury will be done to the wall by the explosion than would be caused by the bursting of a shell that had been placed by the hand against it.

From all this it appears incontrovertible that, as regards the effects to be produced upon batteries by ships, solid shot are decidedly preferable to hollow shot; and the ship that, contemplating the destruction of batteries, should change any of her long twenty-four or thirty-two pound guns for Paixhan guns would certainly weaken her armament. Her best missiles, at ordinary distances, are solid shot; and, if she can get near, grape shot to fire into embrasures and over the walls. The best shells against the batteries are the sea-mortar shells, fired at high elevations; which, being of great weight and falling from a great height, penetrate deeply; and, containing a considerable quantity of powder, cause material ravage by their explosion. Such shells, however, can only be fired by vessels appropriately fitted; namely, by bomb ketches.

The use of these same hollowed shot or shells, by batteries against vessels, is, however, an affair of a different character. The shells do not break against timber; but, penetrating the bulwarks, they, in the first place, would do greater damage than solid shot, by making a large hole and dispersing more splinters; and having, as shot, effected all this injury, they would then augment it many fold by exploding.

In all cases of close action between ship and battery the shells will pass through the nearer side; and, if not arrested by some object on the deck, will probably lodge and explode in the further side, causing by the explosions a much greater loss among the crew, and greater injury to the vessel, than by the mere transit across the vessel; as before suggested, the vessel would suffer less injury were her sides made so thin as not to retain the shell, permitting it to pass through both sides, unless fired with a small velocity. It is not impossible that an extensive use of these horizontal shells may lead to a reduction in the thickness of ship's bulwarks. It is unquestionably true, therefore, that the advantage of this invention or improvement stands, as between forts and vessels, wholly on the side of fortifications; as between sailing vessels and steamers, it is believed to be, as they are now prepared, on the side of sailing vessels; but this last is a point with which we are not now particularly concerned.

Another invention or improvement of modern days was for a time thought to offer important advantages to vessels in contest with forts; not as making the fort more valuable, but the vessel less so. It was the substitution of iron for wood as the material of vessels' hulls. Experience thus far, however, is unfavorable. To make the sides of a thickness to repel shot demands great cost and involves a material loss of buoyancy, and shot passing through the sides of iron vessels are apt not merely to make a hole of about their diameter, as through wood, but to tear whole plates of iron from their rivets. There is good reason to suppose that the use of this material for war vessels has or will be abandoned; if adhered to, to say the least, it will not lessen the advantages possessed by fortification.

The course of the preceding remarks—in discussing the effects upon sea-coast defence, of numerous railroads, and of the use of steamers as war vessels—led to so many incidental observations on the relative influence of fortifications, that the particular point of this influence has already, perhaps, been sufficiently elucidated. Though the relative superiority of fortifications over any other

suggested means has been often enough asserted in these observations, something more must be said as to their *sufficiency* for the security of the great interests on our coast. If willing to trust for their sufficiency to the example of other nations, we should find abundant proof in the practice of all that have taken part in or been exposed to the hazards of war. All have resorted to fortifications, and many have, for long periods of time, owed to them alone exemption from some of the worst of its calamities. The example of other nations at the present moment, as has before been stated, shows, moreover, that they find no other satisfactory reliance under the increased energy now given to the instruments of warfare than an increase of the number and an augmentation of the force of fortifications.

In opposition to this mode of defence much stress is laid on certain successful attacks that have been made by ships on works deemed strong. I have no doubt that all such results might be accounted for by circumstances independent of the naked question of relative strength, but at any rate, when carefully considered, how little do these results prove in comparison with numerous other instances in which there was an immense disparity of force in favor of vessels that have been signally defeated. These latter instances are those that should be received as a test of the actual relation between the two kinds of force; not certainly because they were successful, but because the smaller the works, its armament, its garrison, the less the probability that any extraneous influence has been in operation. A single gun behind a parapet, provided its position be a fair one and the parapet be proof, need, as regards its contest with ships, owe nothing else to the art of fortification; and its effect will be the same whether the battery were fresh from the hands of the ablest engineer of the age or were erected at the dawn of the art. The gun is in a position to be used with effect; the men are as fully protected by the parapet as the service of the gun will allow; they are brave and skillful, and there is nothing to prevent them from doing their duty to the utmost. These are all conditions easily fulfilled, and therefore likely to be so. The state of things is not less just and fair towards the vessel; she chooses her time and opportunity. The battery goes not to the ship, but the ship to the battery, taking the wind, the tide, the sea—all as she would have them; her condition and discipline are perfect, and her crew courageous and adroit. Nothing, under such circumstances, can prevent the just issue of battle but some extraordinary accident, possible indeed to either party, but easily recognized when occurring.

The contest between larger works and heavy squadrons may be much more complicated affairs; the cause of disaster to the former being often traceable to potent, though not always obvious influences. The fortifications may have been absurdly planned originally, or badly executed, for there has at all times been in this profession, as in others, much scope given to quackery; they may have been erected at a time when ships-of-war, against which they were provided, were very different things from the lofty line-of-battle ships of modern times—a long peace or long impunity may have left them in a state wholly unprepared for the sudden use of their strength; the command may have been intrusted to persons ignorant alike of the amount of power in their hands, and of the mode of exercising it; the garrison may have been undisciplined or mutinous; the populace discontented or disloyal; the clamor of frightened citizens may have caused a premature surrender; all these, or any of them may have produced the issue, leaving the question of relative power untouched.

While there can be no doubt that these and other deteriorating influences may have occasionally operated to the prejudice of fortifications, and that these were likely to be more numerous and more controlling as the works were more extensive, it is certain that there can be no influence acting in a reverse direction upon them, that is to say, none making them stronger and more efficient than they ought to be. There can be no favorable influence of such a nature, for example,

as to make the simple one-gun battery, before mentioned, equivalent to a battery (say) ten times as large.

It must not be supposed from what is said in relation to larger fortifications that their magnitude necessarily involves imperfection or weakness, nor because I have considered small and simple works as affording the best solution to the question of relative force must it be inferred that small works are suited to all circumstances. I speak here in reference merely to the judgment we are entitled to form of the relative power of these antagonist forces from their contests as exhibited in history. In instances of the latter sort there cannot, from the nature of the cases, be any important influence operating of which we are ignorant, or for which we cannot make due allowances, while in examples of the former kind we may be in the dark as to many vital matters.

These observations have been deemed necessary because, in judging of this matter, it might not be so obvious that certain brilliant and striking results should not be adopted as affording the true test of relative power. It would be more natural to turn to Copenhagen and Algiers as indicating where the power lies, than to Charleston and Stonington, and yet these latter as indices would be true and the former false.

We will now turn to certain examples.

"The name of Martello tower was adopted in consequence of the good defence made by a small round tower in the Bay of Martello, in Corsica, in the year 1794, which although armed with one heavy gun only, beat off one or two British ships-of-war without sustaining any material injury from their fire. But this circumstance ought merely to have proved the superiority which guns on shore must always in certain situations possess over those of shipping, no matter whether the former are mounted in a tower or not. That this is a just decision will perhaps be readily allowed by all who are acquainted with the following equally remarkable, but less generally known fact, which occurred about twelve years afterward in the same part of the world.

"Sir Sidney Smith, in the Pompée, an eighty-gun ship, the Hydra, of thirty-eight guns, Captain Manby, and another frigate, anchored about eight hundred yards from a battery of two guns situated on the extremity of Cape Lecosa, and protected from assault by a tower in which were five-and-twenty French soldiers, commanded by a lieutenant.

"The line-of-battle ship and the frigate fired successive broadsides till their ammunition was nearly expended, the battery continually replying with a slow but destructive effect. The Pompée (at which ship alone it directed its fire) had forty shot in her hull, her mizzen topmast carried away, a lieutenant, midshipman, and fireman killed, and thirty men wounded. At length, force proving ineffectual, negotiations were resorted to; and, after some hours parley, the officer, a Corsican and relative of Napoleon, capitulated. It then appeared that the carriage of one of the two guns had failed on the second shot, and the gun had subsequently been fired lying on the sill of the embrasure; so that, in fact, the attack of an eighty-gun ship and two frigates had been resisted by a single piece of ordnance."—(Journal of Sieges, by Colonel John T. Jones.)

"The Corsican tower above mentioned, which had in like manner completely baffled a naval cannonade, was very soon found to surrender when attacked by land; not, however, before a small battery had been made (erected) to reduce it."—(Paisley's Course, vol. iii.)

Here are two examples: 1st. A single heavy gun mounted on a tower beat off one or two British ships; 2d. A barbette battery, containing two guns, beat off a British eighty-gun ship, supported by two frigates.

It would seem that no exception can possibly be taken to either instance as trials of relative power. There is no complication of circumstances on one side or the other; nothing to confuse or mislead; all is perfectly simple and plain. A small body of artillery judiciously posted on the shore is attacked by armed

vessels bearing forty or fifty times as many guns, and the ships, unable to produce any effect of consequence, are beaten off with loss.

The cases present no peculiar advantage on the side of the batteries, either as regards position or quality, for both works were immediately reduced by a land attack—that which the eighty-gun ship and two frigates were unable to effect being immediately accomplished by landing two field-pieces with a very small portion of the crew of one of the vessels. On the other hand, there was no peculiar disadvantage on the part of the ships, as the time and mode of attack were of their own choice.

In order that there might be no unjust disparagement of the vessels in the manner of representing the affairs, the language of British military writers (the ships being British) has been exactly quoted.—(See Paisley's Course of Elementary Fortifications, vol. ii, and Journal of Sieges, by Colonel John T. Jones.)

Had the representation of these actions been taken from the victorious party, the result, probably, would have appeared still more to the disadvantage of the ships.

The circumstances attending the attack and defence of Copenhagen, in April, 1801, have already been briefly stated. A more minute description will be found in House document No. 206, 1st session, 26th Congress.

I now proceed to examine a great instance of naval success, in which there is no room to doubt the extent to which fortifications were engaged. This instance is the attack on Algiers, in 1816. The attack was made by the combined English and Dutch fleets, mounting about one thousand guns, under the command of Lord Exmouth.

In the fortifications that looked towards the water there are enumerated, in a plan supposed to be authentic, three hundred and twenty guns; but not more than two hundred of these could act upon the fleet as it lay, The ratio of the forces engaged, therefore, as expressed by the number of guns, (saying nothing of the calibres, of which we know nothing,) was about as five to two. The action continued from a quarter before three until nine, without intermission, and did not cease altogether until half past eleven.

It is very certain that the effect of the fire upon the Algerine shipping and town was very severe, because we know that all the shipping was destroyed except some small vessels; and we know, also, that Lord Exmouth dictated the terms of the treaty that followed.

Honorable as this result was to the combined fleets, and happy as it was for the cause of humanity, there are, nevertheless, technical circumstances connected with it that excite doubts as to how much of the final result was due to physical chastisement, to moral effect, to inherent defects in the defences, and to ignorance in the use of these defences, such as they were. That the loss in killed and wounded in the city and works was great is probable, because we are informed that a very great addition had been made to the garrison, in preparation for the attack, under some impression, no doubt, that a landing would be attempted. For the service of the guns there were needed but three or four thousand men at the utmost. An accumulation beyond that number would add nothing to the vigor of defence, while, by causing an increase of the casualties, it would heighten the terrors of the combat. The depressing effect of this loss of life in the batteries and of the burning of buildings within the town and about the mole was, of course, increased by the entire destruction of the Algerine fleet anchored within the mole.

We have no means of judging of the actual condition of the works; nor of their fitness for the task of contending with the heavy ships of modern times. The forts and batteries on the shore were probably too elevated to be commanded even by the largest of the sailing ships; and, provided these guns were covered with a proof parapet, they may be regarded as being well situated.

But more than half the guns engaged were in the Molehead battery, and the

mode of attack adopted, especially by the Queen Charlotte, of one hundred and ten guns, was calculated to test, in the severest manner, the principles on which this work had been planned. She so placed herself, within "fifty yards" of the extremity of this battery, that she could either rake or take in reverse every part of it. If she at the same time commanded the battery—that is to say, if from her spar-deck she could look down upon its platform—then she must at once, with her grape and canister, have driven the garrison from that platform, leaving only the lower and covered tier of guns, if there were such a tier, for service. With our imperfect knowledge of the fortifications, all this must, however, be left to conjecture.

But there are matters connected with the service of batteries which are not conjecture. Not a shot was fired until the Queen Charlotte had anchored.

What a different vessel, when she anchored, might not this ship have been if the Molehead battery had employed its fire, of more than one hundred guns, in raking her from the time she arrived within a mile and a half until she had anchored within fifty yards! How different might have been the condition of the fleet, generally, if they had been subjected during the approach, and while assuming their stations, to the raking fire of all the two hundred guns!

It does not appear that a single red-hot shot was fired from the batteries.

We might almost rest on this fact, and assert that a defence which had failed to provide itself with this auxiliary means must have been carried on in disregard if not in violation of all rules, all knowledge, and all experience; that it was probably without plan or combination, and not less probably without preparation in other particulars of importance scarcely inferior.

Before leaving this example it may be well to inquire what, after all, was the effect of these batteries upon the ships, compared with the effect of ships upon ships.

In the battle of the Nile the French fleet, rated at one thousand one hundred and ninety guns, caused a loss in Nelson's fleet of eight hundred and ninety-five killed and wounded, which is in the proportion of ten French guns to less than eight Englishmen killed and wounded. In the battle of Trafalgar the French fleet carried not less than three thousand guns, and they caused a loss to the English of one thousand five hundred and eighty-seven killed and wounded, which is in the proportion of ten guns to less than six killed and wounded. In this affair of Algiers, with a force not exceeding two hundred guns, the batteries caused a loss of eight hundred and eighty-three killed and wounded, being in the proportion of ten guns to forty-four men; and if we take into account every gun that was pointed over the bay, (say three hundred and fifty guns,) the proportion will be ten guns to twenty-five men; being an effect more than three times as great as that produced by the French ships at the battle of the Nile, and more than four times as great as that produced by the same nation at Trafalgar.

While reflecting on the circumstances of this battle the mind is not satisfied with any reasons that present themselves for the withdrawal of Lord Exmouth, the moment the land wind enabled him to do so, on the supposition of entire success on his part. It is not understood why he should feel the great anxiety he states himself to have been under that this wind should spring up. "Providence at this interval," (between ten and eleven o'clock at night,) "gave to my anxious wishes the usual land wind common in this bay, and my expectations were completed. We were all hands employed in warping and towing off, and, by the help of the light air, the whole were under sail and came to anchor out of the reach of shells about two in the morning, after twelve hours of incessant labor."

Now if anything had been decided by the action it must have been one of two things: either the ships were victorious or the batteries were so. If the ships were completely victorious it would seem to have been judicious for them to remain where they were, in order, if there was to be any more fighting, to be

ready to press their advantage, and especially in order to maintain the ascendency, by preventing the remounting of guns, repairing batteries and re-supplying them with munitions, &c.

Had the people possessed the inflexibility report ascribed to the Dey, and had they set zealously about the work of preparation for a new contest, it might not have been easy for Lord Exmouth, in the condition to which his ships are acknowledged by authentic accounts to have been reduced, to enforce his demands. It is not understood, therefore, why, if he had been so successful as to be certain that his end was attained, he should be so anxious to get out of gun-shot, when by so doing he involved the issue in more or less doubt and hazard.

He relied on the effect produced on the people by his dreadful cannonade, and the result proves that he was right; but his anxiety to clear the vessels from the contest shows that there was a power still unconquered, which he thought it best to leave to be restrained by the suffering population of the city than keep in a state of exasperation and activity by his presence. What was this power but an unsubdued energy in the batteries?

The true solution of the question is, then, not so much the amount of injury done on the one side or the other—particularly as there was, on the one side, a city to suffer as well as the batteries—as the relative efficiency of the parties when the battle closed at about eleven o'clock. All political agitation and popular clamor aside, what would have been the result had the fight been continued, or even had Lord Exmouth renewed it next morning?

These are questions that can be answered only on conjecture; but the manner the battle ended certainly leaves room for many doubts whether, had the subsequent demands of Lord Exmouth been rejected, he had it in his power to enforce them by his ships; whether, indeed, if he had renewed the fight, he would not have been signally defeated.

On the whole, this battle, although it stands pre-eminent as an example of naval success over batteries, presents no argument to shake the confidence which fortifications, well situated, well planned, and well fought, deserve as the defences of a seaboard.

Gibraltar.—The attack on the water batteries of Gibraltar, in September, 1782, by the French and Spanish floating batteries, is a well known instance of the power of guns on shore.

These floating batteries had been rendered, as was supposed, shot proof and shell proof, by several additional thicknesses of timber to the sides, and by covering the decks with a roof of sloping timbers.

They mounted one hundred and forty-two guns on the engaged side, with seventy in reserve to replace any that might be dismounted. They were anchored at the distance of about one thousand yards from the walls, and were opposed by about eighty-five guns.

After a protracted cannonade nine of the floating batteries were burnt by hot shot from the shore, and the tenth, having been taken possession of by the victors, was set on fire by them.

No material injury was done to the works of the town by their fire, and only eighty-five men and officers were killed and wounded by the fire from these vessels, together with a very violent cannonade and bombardment from the siege batteries.

Battle of Algesiras.—On the 6th of July, 1801, the French admiral Lenois was lying at anchor off the town of Algesiras with two ships of eighty guns, one of seventy-four guns, and one frigate. To the south of him, on a small island, was a battery, called the Green island battery, mounting seven eighteen and twenty-four pounders; and to the north of him, on the main, another battery, called St. Jacques's battery, mounting five eighteen-pounders. There were, besides, fourteen Spanish gunboats anchored near, making a total of three

hundred and six guns afloat and twelve guns in battery—altogether three hundred and eighteen guns.

Sir James Saumarez hearing that Lenois was in this position, advanced against him from Cadiz with two ships of eighty guns, four of seventy-four guns, one frigate, and a lugger—in all five hundred and two guns. On his approach, Lenois, who was anchored in a line nearly north and south at some distance from the shore, cut his cables, and ran into shoal water to prevent being doubled upon by the British line: this manœuvre at the same time entirely unmasked the fire of the batteries.

The Hannibal, one of the British seventy-fours, in attempting to close with the French admiral, touched the ground and could not be floated off. She, however, continued the fight with great obstinacy, even for a considerable time after she was deserted by her consorts. Not being able to double upon the French line, an attempt was made to assault the Green island battery, which, being badly served by the Spaniards, had nearly ceased firing.

But this attempt was anticipated by the arrival at the island of a party sent from the French frigate lying near; and the assault was defeated with the loss to the English of one boat sunk and another taken—the Frenchmen renewing with vigor the fire of the battery. At the north end of the line the French admiral was aided by seven gunboats, which took so active a part in the fight that five of them were sunk or rendered unserviceable. The St. Jacques battery being, however, served sluggishly by the Spaniards, the French sent a party from the Dessaix to impart greater activity and effect.

After the combat had continued about six hours, the British squadron drew off greatly damaged, leaving the Hannibal seventy-four alone and aground; and she, after suffering great loss, was obliged to strike. The French insist that the Pompée, an English ship of eighty guns, had struck her colors; but as they could not take possession, she drifted off and was towed away: it is believed she was entirely dismasted.

We do not know the loss in the French squadron, but the killed, wounded, and missing in the English fleet amounted to three hundred and seventy-five men; being more than twelve men for every ten guns against them, and being twice as great in proportion as the English loss in the battle of Trafalgar.

In this battle of Algesiras there were five hundred and two English guns afloat acting against three hundred and six French guns afloat. As the English chose their own time for the attack and had the wind, it is only reasonable to suppose that three hundred and six of the English guns were a match for the three hundred and six guns of the French vessels. This will leave one hundred and ninety-six English guns afloat, opposed to the twelve guns in the batteries; or, reckoning one side only of each ship, it shows ninety-eight guns in the British fleet to have been overmatched by the twelve guns in the batteries.

There never was a more signal and complete discomfiture, and it will admit of no other explanation than that just given; namely, that the two small batteries, one of five and the other of seven guns, partly eighteen and partly twenty-four pounders, more than compensated for the difference in favor of the British fleet of one hundred and ninety-six guns.

The Hannibal got aground, it is true; but she continued to use her guns, with the best effect, until she surrendered; and even on the supposition that this ship was useless after she grounded, the British had still an excess of one hundred and twenty-two guns over the French fleet and batteries.

These batteries were well placed, and probably well planned and constructed, but there was nothing extraordinary about them; their condition before the fight was complained of by Admiral Lenois, and they were badly fought in the early part of the action; still the twelve guns on shore were found to be more than equivalent to two seventy-fours and one frigate.

Battle of Fuenterabia.—This recent affair introduces steam batteries to our notice.

On the 11th of July, 1836, six armed steamers, together with two British and several Spanish gunboats, attacked the little town of Fuenterabia. The place is surrounded only by an old wall, and two guns of small calibre, to which, on the evening of the attack, a third gun of larger calibre was added, formed the entire of its artillery. The squadron cannonaded this place during a whole day, and effected absolutely nothing beyond unroofing and demolishing a few poor and paltry houses, not worth, perhaps, the ammunition wasted in the attack. What may have been the number of guns and weight of metal which the assailants brought is unknown; though the superiority, independent of the superior weight of metal, must have been at least ten to one; but not the slightest military result was obtained.—(See United Service Journal, *August* 1836, p. 531.)

We will now turn to affairs of a similar character on our own coast.

In June, 1776, Sir Peter Parker, commanding a squadron of two ships of fifty guns, four of twenty-eight guns, two of twenty guns, and a bomb ketch—in all (according to their rate) two hundred and fifty-two guns—attacked Fort Moultrie, in Charleston harbor, South Carolina.

It is stated that the fort mounted "about thirty pieces of heavy artillery." Three of the smaller vessels were aground for a time during the action, and one of them could not be floated off, and was in consequence burnt by the English. Deducting this vessel as not contributing to the attack, and supposing the other two were engaged but half the time, the English force may be estimated at two hundred guns; or reckoning one broadside only, at one hundred guns against thirty guns.

The English were defeated with great loss of life and injury to the vessels; while the fort suffered in no material degree, and lost but thirty men. The killed and wounded in the squadron were reported by the commodore to be two hundred and five; being for every ten guns employed against them more than sixty-eight men killed and wounded—a loss more than eleven times as great, in proportion to the opposing force, as the loss at the battle of Trafalgar.

In September, 1814, a squadron of small vessels, consisting of two ships and two brigs, mounting about ninety guns, attacked Fort Boyer, at the mouth of Mobile bay. A false attack was at the same time made by a party of marines, artillery, and Indians, on the land side. The fort was very small, and could not have mounted more than twenty guns on all sides, nor more than fifteen guns on the water fronts. The action continued between two and three hours, when one of the ships, being so injured as to be unmanageable, drifted ashore under the guns, and was abandoned and burnt by the English; the other vessels retreated, after suffering severely.

There were ten men killed and wounded in the fort; the loss on the other part is not known.

The affair of Stonington, during the last war, affords another instance of successful defence by a battery. In this case there were only two guns (eighteen-pounders) in a battery which was only three feet high, and without embrazures. The battery being manned exclusively by citizen volunteers from the town, repelled a persevering attack of a sloop-of-war, causing serious loss and damage, but suffering none.

In order not to extend this branch of the report further, I beg leave to refer for a detailed account of the attack of the French, in 1838, on the castle of St. Juan d'Ulloa, to the document before referred to.—(House Doc. 206, 1st session, 26th Congress, p. 25.) For the same reason I abstain from introducing several others instances which, though interesting and instructive, would not sensibly affect the argument.

In the fact quoted above there is no illustration of the effect of hot shot, except in the case of Gibraltar. In that attack the floating batteries were

made proof against cold shot, and, as was thought by the constructor, proof against hot shot also; and so, indeed, for a time, it seemed. It was conceived that the hot shot, when buried deep in the closely jointed timbers, would scarcely communicate flame, and that it would not be difficult, by the use of the fire-engines provided, to subdue so stifled a combustion.

By making these floating batteries impenetrable to shot, it was supposed they had been rendered equal in perfectly smooth water to land batteries, gun for gun. And so they might *then* have been, nearly, had the incombustibility of the latter been imparted to them. But now resistance to fire would not suffice; these floating batteries must either repel these horizontal shells from their bulwarks, or if that be impossible, permit them to pass though both sides. Nothing can be better calculated to exhibit the tremendous effect of these shells than a vessel so thicksided as to stop every shell, allowing it to burst when surrounded by several feet of timber; and there can be no greater mistake than supposing that, by thickening the bulwarks of vessels-of-war, or fitting up steam-batteries with shot-proof sides, the effects of land batteries are to be annulled or in any material degree modified.

This branch of the subject will be summed up with the remark that the facts of history and the practice of all warlike nations are in perfect accordance with the conclusions of theory. The results that reason anticipated have occurred again and again. And so long as on the one side batteries are formed of earth and stone, and on the other, ships are liable to be swallowed up by the element on which they float, or to be deprived of the means by which they move—so long as they can be penetrated by solid shot, set on fire or blown up by hot shot, or torn piecemeal by shells, the same results must inevitably be repeated at each succeeding trial.

But after all, it may be urged that the general principle herein contended for, namely, the superiority of batteries in a contest with ships, might be admitted, and still it would remain to show that batteries constitute the kind of defence best adapted to our peculiar wants. This is true; and I will now proceed to consider, severally, the cases to which defence must be applied. It may be well, however, first to recal the general scope of the preceding argument. It has been contended that floating defences should not be relied on—not because they are actually incompetent to the duty, but because they cannot fulfil this duty unless provided in inordinate numbers, and at a boundless expense; and I have endeavored to show that this remark is generally true, whether the defensive fleet be made up of sea-going vessels, of floating batteries, or of steam batteries. I have next urged the point that properly planned and constructed batteries are an overmatch for vessels-of-war, even when greatly inferior to them in armament—sustaining the opinion by many striking examples, and explaining satisfactorily instances that have cast any doubt on such contests.

If the facts and reasoning presented do not convey the same strong convictions that sway my own mind, it must be because I have obscured rather than illustrated them; for it would seem to be impossible that facts could be more unexceptionable or reasons more beyond the reach of cavil. However that may be, I now leave them to candid and dispassionate revisal, and proceed to examine the mode of applying these defences to our own coasts.

It may be well to divide these into several distinct classes.

1. There will be all the smaller towns upon the coast, constituting a very numerous class.

At the same time that no one of these, of itself, would provoke an enterprise of magnitude, it is still necessary to guard each and all against the lesser attacks. A small vessel might suffice to guard against single vessels that would otherwise be tempted by the facility to burn the shipping and exact a contribution; but something more than this is necessary, since the amount of temptation held out by a number of these towns would be apt to induce operations on a

larger scale. It might often happen, moreover, that our own vessels-of-war would be constrained to take refuge in these harbors, and they should find cover from the pursuer.

Although the harbors of which we now speak afford every variety of form and dimension, there are few, or none, wherein one or two small forts and batteries cannot be so placed as to command all the water that a ship-of-war can lie in, as well as the channel by which she must enter. While the circumstances of no two of them are so nearly alike as not to modify the defences to be applied to them severally, all should fulfil certain common conditions, namely: the passage into the harbors should be strongly commanded; the enemy should find no place after passing wherein he would be safe from shot and shells; and the works should be inaccessible to sudden escalade—that is to say, a small garrison should be able to repel such an assault. With works answering to these conditions, and of degrees of strength in accordance with the value of their respective trusts, this class of harbors may be regarded as secure. I cannot, however, here avoid asking what would be the mode of defence, if purely naval, of these harbors? Suppose the circumstances are deemed to require the presence of a frigate, or a steam-frigate, or an equivalent in gunboats; would not *two* hostile frigates or two steam-frigates infallibly arrive in quest? Could there be devised a system more certain to result in the capture of our vessels and the submission of our towns?

2. Another class will consist of great establishments, such as larger cities, naval depots, &c., situated in harbors not of too great extent to admit of good defence at the entrance, and also at every successive point, so that an enemy could find no spot within in which he could safely prepare for operations ulterior to the mere forcing an entrance.

In this class are to be found objects that are in every sense of the highest value. On the one hand, accumulations of military and naval material, and structure for naval accommodation that could not be replaced during a war, which are of indispensable necessity and of great cost; and on the other hand, the untold wealth of great cities. As these objects must be great in the eyes of the enemy—great for him to gain and for us to lose—corresponding efforts on his part must be looked for and guarded against. If he come at all, it will be in power; and the preparations on our part must be commensurate.

The entrance to the harbor and all the narrow passes within it must be occupied with heavy batteries; and if nature does not afford all the positions deemed requisite, some must, if practicable, be formed artificially. Batteries should succeed each other along the channel, so that the enemy may nowhere find shelter from effective range of shot and shells while within the harbor, even should he succeed in passing the first batteries. Provided the shores admit this disposition, and the defence be supplied with an armament numerous, heavy, and selected with reference to the effects on shipping, the facts quoted from history show that these defences may be relied on.

If the mere passing under sail with a leading wind and tide one or even two sets of batteries, and then carrying on operations out of the reach of these or any other, were all, the enemy might perhaps accomplish it; but the present supposition is, that with this class his ulterior proceedings, and finally his return, are to be subject to the incessant action of the defences.

3. This brings us to consider a third class, consisting of establishments of importance situated at a distance up some river or bay, there being intermediate space too wide to be commanded from the shores. In such cases the defence must be concentrated upon the narrow passes, and must, of course, be apportioned in armament to the value of the objects covered. When the value is not very great, a stout array of batteries at the best positions would deter an enemy from an attempt to force the passage, since his advantage, in case of success, would not be commensurate with any imminent risk. But with the more valu-

able establishments it might be otherwise. The consequence of success might justify all the risk to be encountered in rapidly passing in face of batteries, however powerful. This condition of things requires peculiar precautions under any system of defence. If, after having occupied the shores in the narrow places in the best manner with batteries, we are of opinion that the temptation may induce the enemy, notwithstanding, to run the gauntlet, the obstruction of the passage must be resorted to. By this is not meant the permanent obstruction of the passage; such a resort, besides the great expense, might entail the ruin of the channel. The obstruction is meant to be the temporary closing by heavy floating masses.

There is no doubt that a double line of rafts, each raft being of large size and anchored with strong chains, would make it impossible to pass without first removing some of the obstructions; and it might clearly be made impossible to effect this removal under the fire of batteries. Such obstructions need not be resorted to until the breaking out of a war, as they could then be speedily formed should the preparation of the enemy be of a threatening nature.

There would be nothing in these obstructions inconsistent with our use of part of the channel, since two or three of the rafts might be kept out of line, ready to move into their places at an hour's notice.

The greatest danger to which these obstructions would be exposed would be from explosive vessels, and from these they might be protected by a boom or a line of smaller rafts in front.

From what has just been said, it will be perceived that when the inducements are such as to bring the enemy forward in great power, and efficient batteries can be established only at a few points, we are not then to rely on them exclusively. In such a case the enemy should be stopped by some physical impediments, and the batteries must be strong enough to prevent his removing these impediments; and also to prevail in a cannonade, should the enemy undertake to silence the works. Not to encumber this report with details in relation to these channel obstructions, I beg leave to refer for them to the same document 206, page 34.

It may be repeated here that such expedients need not be resorted to, except to cover objects of the highest importance and value, such as would induce an enemy to risk a large expedition. For objects of less importance batteries would afford ample protection. It will be remembered that this last power is, when once established in any position, a constant quantity, and although it should be incompetent to effect decisive results when diffused over a large fleet, may be an overmatch for any small force upon which it should be concentrated. At the same time, therefore, that there is the less liability to heavy attack, there will be in the batteries the greater capacity of resistance to others.

It must not be urged, as a reproach to fortifications, that in the case we are considering they are obliged to call in aid from other sources, so long as these aids are cheap, efficient, and of easy resort. By the mode suggested the defence will undoubtedly be complete, every chance of success being on the side of the defence: that is to say, if any confidence is to be placed in the lessons of experience. How, on the other hand, will the same security be attained by naval means? Only, as before shown, by keeping within the harbor a fleet or squadron, or whatever it may be, which shall be at all times *superior* to the enemy in number of guns.

In a naval defence there will be no advantage in obstructions of any sort, for there can be no lessening of the array of guns in consequence of such obstruction, because if these obstructions are under the fire of the floating defences, the enemy will first subdue that fire and then remove the obstructions at his leisure. If this fire proves too powerful for the enemy, the obstructions will have been unnecessary, and will serve only to shut up our own fleet, preventing the prompt pursuit of a beaten foe.

4. There is a fourth class, consisting of harbors, or rather bays or estuaries, of

such expanse that batteries cannot be made to control the passage. These have been before spoken of. If the occupation of or passage through these must be defended, it must be by other means than batteries upon the shore. The reliance must, from the nature of the case, be a floating defence of magnitude at least equal to the force the enemy may bring. The complete defence of each of these bays would, therefore, involve very great expense—certainly, in most cases, greater than the advantages gained. The Chesapeake bay cannot, for instance, be shut against a fleet by fortifications; and if the entrance of the enemy is to be interdicted, it must be by the presence of a not inferior fleet to his own. Instead of such a system, it will be better to give up the bay to the enemy, confining our defence to the more important harbors and rivers that discharge into the bay.

By this system not only will these harbors be secured, but the defences will react upon the bay itself, and at any rate secure it from predatory incursions, because, as before shown, while Hampton Roads and the navy yard at Norfolk are well protected, no enemy would proceed up the bay with any less force than that which could be sent out from the navy yard. In certain cases of broad waters, wherein an enemy's cruisers might desire to rendezvous in order to prosecute a blockade or as a shelter in tempestuous weather, there may be positions from which sea-mortars can reach the whole anchorage, although nothing could be done with guns. A battery of sea-mortars, well secured from escalade, would in such a case afford a good defence, because no fleet will lie at anchor within the range of shells.

In thus distributing the various exposed points of the sea-coast into general classes, according to the most appropriate modes of defence, we do not find that anything can be substituted for fortifications, where fortifications are applicable, and we find them applicable in all the classes but the last, and in the last we shall find them indispensable as auxiliaries. In this last class there are, no doubt, some cases where naval means must constitute the active and operative force; and it is probable that steam batteries may, of all floating defences, be most suitable, as before stated.

Before proceeding to a specification of the positions on our coast requiring fortifications, something more should be said on the general subject, though on another branch, namely: the proper magnitude and strength to be given to these fortifications.

The present system is founded on this principle, to wit: That the fortifications should be strong in proportion to the value of the objects to be secured. The principle will not, I suppose, be controverted, although the mode of applying it may be.

There will hardly be a difference of opinion as to the mode of guarding the less important points. There being no great attraction to an enemy, works simple in their features, requiring small garrisons only, containing a moderate armament, but at the same time inaccessible to the dashing enterprises that ships can so easily land, and which can be persevered in for a few hours with much vigor, will suffice. Circumstances must, however, materially modify the properties of these works, even when the points to be guarded are of equal value. In one, the disadvantage of position must be compensated by greater power; in another, natural strength may need little aid from art; in another, greater width in the guarded channel may demand a larger armament; and in a fourth, peculiar exposure to land attack may exact more than usual inaccessibility; but all these varieties lie within limits that will probably be conceded.

As to the larger objects, it has been contended that there has been exaggeration in devising works to cover these, the works having been calculated for more formidable attacks than they will be exposed to.

It is easy to utter vague criticisms of this nature, and it is not easy to rebut them without going into an examination as minute as if the criticisms were ever so precise and pertinent.

But let us look a little at the material facts. What is the object of an enemy? What are his means? What should be the nature of our defences?

The object may be to lay a great city under contribution, or to destroy one of our naval depots, or to take possession of one of our great harbors, &c.

It was estimated that in the great fire in the city of New York in the year 1835, the property destroyed within a few hours was worth upward of $17,000,000, although the fire was confined to a very small part of the city, and did not touch the shipping. Is it easy, then, to estimate the loss that would accrue from the fires that a victorious enemy could kindle upon the circuit of that great city, when no friendly hand could be raised to extinguish them? or is it easy to overrate the tribute such a city would pay for exemption from that calamity? Can we value too highly the pecuniary losses that the destruction of one of the great navy yards would invoke? and the loss beyond all pecuniary value of stores and accommodations indispensable in a state of war, and that a state of war could hardly replace?

But what are the enemy's means? They consist of his whole sea-going force, which he concentrates for the sake of inflicting the blow.

"*From the nature of maritime operations, such a fleet could bring its whole strength to bear upon any particular position, and by threatening or assailing various portions of the coast, either anticipate the tardy movements of troops upon land and effect the object before their concentration, or render it necessary to keep in service a force far superior to that of the enemy, but so divided as to be inferior to it on any one point.*"*

We have, then, objects of sufficient magnitude, and the means of the enemy consist in the concentration of his whole force upon one of these objects.

With the highest notion of the efficiency of fortifications against shipping, these are not cases where any stint in the defensive means are admissible. Having, therefore, under a full sense of the imminent danger to which the great objects upon the coast are exposed, applied to the approaches by water an array of obstacles worthy of confidence, we must carefully explore all the avenues by land, in order to guard against approaches that might be made on that side in order to evade or to capture the works guarding the channels.

But before deciding on the defences necessary to resist these land attacks, it will be proper to estimate more particularly the means that an enemy may be expected to bring forward, with a view to such land operations.

History furnishes many examples, and the expedition to Flushing, commonly called the Walcheren expedition, may be cited as peculiarly instructive.

From an early day Napoleon had applied himself to the creation of a maritime force in the Scheldt; and in 1809 he had provided extensive dockyards and naval arsenals at Flushing and at Antwerp. On his invasion of Austria that year he had drawn off the masses of his troops that had before kept zealous watch over these naval preparations, relying now on forts and batteries, and on the fortifications of Flushing and Antwerp for the protection of the naval establishments and of a fleet containing several line of battle ships and frigates and a numerous flotilla of smaller vessels.

The great naval establishment at Flushing, near the mouth of the Scheldt, and of Antwerp, some sixty or seventy miles up the river, with the vessels afloat on the river or in progress in the yards, presented an object to England worthy of one of her great efforts.

The troops embarked in this expedition consisted of upwards of thirty-three thousand infantry, three thousand cavalry, more than three thousand artillery, and some hundred of sappers and miners, constituting an army of about forty thousand men.

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* Mr. Secretary Cass.

The naval portion consisted of thirty-five sail of the line, twenty-three frigates, thirty-three sloops-of-war, twenty-eight gun, mortar, and bomb vessels, thirty-six smaller vessels, and eighty-two gunboats, making a total of one hundred and fifty-five ships and other armed vessels, and eighty-two gunboats. The guns, mortars, &c., provided for such bombardments and sieges as the troops might have to conduct, amounted to one hundred and fifty-eight pieces, with suitable supplies of ammunition and stores of every kind.

The idea of sailing right up to their object, in spite of the forts and batteries, seems not to have found favor, notwithstanding the power of the fleet. The plan of operations, therefore, contemplated the landing a portion of the army on the island of Walcheren, to carry on the siege of Flushing, while another portion proceeded up the Scheldt, as high as Fort Bartz, which was to be taken; after which the army would push on by land about twenty miles further and lay siege to Antwerp, all of which it was thought might be accomplished in eighteen or twenty days from the first landing.

The execution did not accord with the design. Flushing, it is true, was reduced within fifteen days; and in less than a week from the debarkation (which was on the 31st of July) Fort Bartz was in possession of the English, having been abandoned by the garrison. But it was twenty-five days before the main body, with all necessary supplies for a siege, were assembled at this point and ready to take up the line of march against Antwerp. Since the first descent of the British matters had, however, greatly changed.

The French were now in force; they had put their remaining defences in good condition; they had spread inundations over the face of the country; and not only would there be little chance of further success, but the safety of the expedition, formidable as it was, might have been compromised by a further advance; it was therefore decided in council to abandon the movement against Antwerp; the troops accordingly returned to the island of Walcheren, which they did not finally leave till the end of December.

The failure in the ultimate object of the expedition is to be ascribed to the omission to seize, in the first instance, the south shore of the river and capture the batteries there, as was originally designed, and which was prevented by the difficulty of landing enough troops at any one debarkation in the bad weather then prevailing. The capture of these batteries would have enabled the expedition to have reached Fort Bartz during the first week; and, in the then unprepared state of the French, the issue of a dash upon Antwerp can hardly be doubted.

The dreadful mortality that assailed the British army is wholly unconnected with the plan, conduct, or issue of the enterprise as a military movement; unless, indeed, it may have frustrated a scheme for occupying the island of Walcheren as a position during the war.

Possession was held of the island for five months; and it was finally abandoned, from no pressure upon it by the French; although, after the first six weeks, the British force consisted, in the aggregate, of less than seventeen thousand men, of which, for the greater part of the time, more than half were sick—effectives being often reduced below five thousand men.

We see, therefore, that an effective force of less than ten thousand men maintained possession of the island in the face of, and in close proximity to, the most formidable military power in Europe, for more than three months. And no reason can be perceived why it might not have remained an indefinite period while possessed of naval superiority.

The proximity of England undoubtedly lessened the expense of the expedition; but it influenced the result in no other way material to the argument.

I will allude to no other instances of large expeditions sent by the English to distant countries than the two expeditions, each of about ten thousand men, sent, in the year 1814, against this country—one by the way of Canada, the

other to the Gulf of Mexico. United, in a single force of twenty thousand men against our sea-coast, the expense would have been less and the result more certain.

The French, notwithstanding their constant naval inferiority, have found opportunities to embark in great undertakings of the same nature. In 1802 Leclerc proceeded to St. Domingo with thirty-four line of battle ships and large frigates, more than twenty small frigates and sloops, and upwards of twenty thousand men. We learn from these points in history what constitutes an object worthy of vast preparations, and it is impossible to resist the fact that our own coast and rivers and bays possess many establishments not less inviting to an enemy than Flushing and Antwerp.

We are taught, moreover, what constitutes a great expedition; in other words, what is the amount of force we must prepare to meet. And, more than all, we are taught that such an expedition, seizing a favorable moment when the military arrangements of a country are incomplete, when the armies are absent or imperfect in their organization or discipline, does not hesitate to land in the face of the most populous districts; and availing of the local peculiarities, and covered and supplied by a fleet, to undertake operations which penetrate into the country and consume considerable time.

It seems, therefore, that whenever the object we are to cover possesses a value likely to provoke the cupidity of an enemy, or to stimulate his desire to inflict a serious blow, it is not enough that the approaches by water are guarded against his ships; it will be indispensable to place safeguards against attacks by land also. A force considerable enough for very vigorous attacks against the land sides of the fortifications may be thrown upon the shore; and, if these yield, a way is opened for the ships, and the enemy carries his object.

In certain positions the local circumstances would favor the land operations of an enemy, permitting him, while operating against the fortifications, to be aided by the fleet and covered from the reaction of the general force of the country. In other positions the extreme thinness of the population in the neighborhood would require the forts to rely for a considerable time solely on their own strength. In all such cases a much greater power of resistance would be requisite than in circumstances of an opposite nature. In all such circumstances the works should be of a strength adequate to resist an attack, although persevered in vigorously for several days. But when these land operations lead away from the shipping, or when the surrounding population is considerable, or when considerable numbers of volunteers or regulars can be speedily drawn in by steamers or railroads, or the enemy is unable to shelter his movements by local peculiarities, then it will suffice if the work can withstand vigorous attacks for a few hours only.

The magnitude and strength of the work will depend, therefore, on the joint influence of the value of the objects covered, the natural strength of the position, and the succor to be drawn from the country. We may introduce, as instances, New York and Pensacola. The former is as attackable as the latter; that is to say, it equally requires artificial defences; and, owing to its capacious harbor and easy entrance, it is not easy to place it in a satisfactory condition as to the approaches by water. But, while an enemy in approaching any of the principal works by land could not well cover himself from the attacks of the concentrated population of the vicinity, the rapid means of communication from the interior would daily bring great accession to the defence. A land attack against the city must consequently be restricted to a day or two, and the works will fulfil their object if impregnable to a *coup de main*.

Pensacola, an object in many respects of the highest importance, and growing in consequence every day, is capable of being defended as perfectly as the city just mentioned. The principal defences lie on a long sandy island which closes in the harbor from the sea. An enemy landed on this island (Santa Rosa) would

be in uninterrupted communication with his fleet, could, owing to the sparseness of its population, have nothing to apprehend for some time from any reinforcements arriving at the place, and would be well protected by position from the effects of this succor when it should arrive.

While in possession of naval superiority, he might, therefore, not unreasonably calculate on being able to press a siege of many days of the work which occupies the extremity of the island and guards the entrance to the harbor. And even before coming into possession of this work, his gun and mortar batteries on the same island could destroy everything not bomb-proof and incombustible at the navy yard.

An attack not less persevering, and with equal chances of success, might be made from the other side of the harbor also.

If, therefore, the power to resist a *coup de main* be all that is conferred on the works at Pensacola, their object will be attained only through the forbearance of the enemy, it being obviously indispensable that the principal of these works be competent to resist a short siege. If this liability resulted from the thinness of the neighboring population, it would still be many years before this state of things would be materially altered.

But it does not depend on this alone: the peculiar topographical features will continue this liability in spite of increasing numbers and ever so easy and rapid communication with the interior, it having been proved that a fleet may lie broad off this shore and hold daily communication therewith during the most tempestuous season. The English fleet of men-of-war and transports lay, during the last war, from February 7 to March 15, 1814, anchored abreast of Dauphin island and Mobile Point, where the exposure is the same as that off Pensacola.

Between the cases cited, which may be regarded as the class of extreme cases, (a class comprising, however, many important positions,) almost every conceivable modification of the defence will be called for to suit the various conditions of the several points.

The fortifications of the coast must therefore be competent to the double task of interdicting the passage of ships and resisting land attacks—two distinct and independent qualities. The first demands merely an array, in suitable numbers and in proper proportions, of heavy guns covered by parapets proof against shot and shells; the second demands inaccessibility. As there is nothing in the first quality necessarily involving the last, it has often happened, either from the little value of the position or from the supposed improbability of a land attack, or from the want of time to construct proper works, that this property of inaccessibility has been neglected.

Whenever we have an object of sufficient value to be covered by a battery, we should bear in mind that the enemy will know the value of the object as well as ourselves; that it is a very easy thing for him to land a party of men for an expedition of an hour or two; and unless we take the necessary preventive measures his party will be sure to take the battery first, after which nothing will prevent his vessels consummating the design it was the purpose of the battery to prevent. In general, the same fortifications that guard the water approaches will protect the avenues by land also; but in certain cases a force may be so landed as to evade the channel defences, reaching the object by a route entirely inland. Of course this danger must be guarded against by suitable works whenever the people cannot come promptly to the rescue.

After the preceding exposition of views on the general subject of the defences of the coast, it may not be out of place here to indicate the mode by which the system of fortifications can be manned and served without an augmentation, for that particular purpose, of the regular army.

The force that should be employed for this service in time of war is the militia, (using the term in a comprehensive sense,) the probability being that, in most of the defended points on the seaboard, the uniformed and volunteer companies

will supply the garrisons needed; and it may be shown that it is a service to which militia are better adapted than to any other. The prominent defect of a militia force results from the impossibility of so training the men to field movements in the brief period of their service, as to give them any confidence in themselves as manœuvrers in the face of regular troops. The little they learn merely suffices to show them that it is but little; every attempt of the kind proving, by the disorders that they know not how to avoid, how much greater would be the disorder if in the face of an enemy and under fire.

Without the knowledge to be obtained only by long and laborious practice, the militiaman feels that he is no match, in the field, for the regular soldier, and it would not be surprising should he desire to avoid an encounter. But there is no such difficulty in the service of fixed batteries; the militiaman has there to be taught merely the service of a single gun, than which nothing can be more simple. He must learn to use the rammer, and the sponge, the handspike, and the linstock; to load and to run to battery, to trail and to fire; these are all. Each of these operations is of the utmost simplicity, depending on individual action and not on concert, and they may all be taught in a very short time. There is no manœuvring, no marching, no wheeling. The squad of one gun may be marched to another, but the service of both is the same. Even the art of pointing cannon is to an American militiaman an art of easy attainment, from the skill that all our countrymen acquire in the use of fire-arms, "drawing sight" or "aiming" being the same art, modified only by the difference in the gun.

The mode of applying this force may be illustrated by the case of any of our cities on the seaboard. The forts and batteries being put in perfect condition, should be garrisoned by a small body of regular artillery, such as a moderate military force could supply, and sufficient for the preservation of the public property, and to afford indispensable daily guards. To these should be added two or three men of the ordnance department, especially charged with the condition of the armament and ammunition, and two or three engineer soldiers, whose sole duty it would be to attend to the condition of the fortifications, keeping every part in a state of perfect repair. In certain important works, however, that would be liable to a violent assault, or exposed to siege, or to analogous operations, it would be necessary, especially on the approach of a war, to keep up a more considerable body of regular troops. The volunteer force of the city should then be divided into detachments, if possible, without disturbing their company organization, and should be assigned to the several works according to the war garrisons required at each—from four to six men, according to circumstances, being allowed to each gun. The larger works might require ten, fifteen, or even twenty companies; the smaller ones, two, three, or more companies; and in some cases even a platoon might suffice. Being thus occupied, each portion of the city force would have its definite alarm post, and should be often taken to it and there exercised in all the duties of its garrison, and more especially in the service of its batteries, and in its defence against assault. The multiplicity of steamboats in all the cities would enable the volunteers to reach even the most distant alarm posts in a short time. In order that all these troops may become expert in their duty, one of the works most convenient to the city, beside being the alarm post of some particular portion of the volunteers, should, during peace, be the ordinary school of drill for all; and in this the detachments should in turns assemble and exercise.

Beside the mere manual of the gun and battery, there should be frequent target practice, as being not only necessary in teaching the proper use of the battery, but as imparting interest and excitement to the service.

It might be necessary for a time to submit the volunteers to the drill of a competent officer or non-commissioned officer of the regular artillery; and in particular, to conduct the practice with shot and shells under such inspection.

The portion of the military force of the city not stationed in the fixed batteries would constitute, under an impending attack, a reserve posted either in one or several bodies, according to circumstances, ready to cover exposed points, to co-operate in offensive movements, or to relieve exhausted garrisons: this portion having connected with it the mounted force, the field artillery and the heavy movable guns.

This appropriation of the volunteer force to the immediate defence of the city, would operate in the most favorable way upon that force; superadding to the impulses of patriotism, every feeling connected with family property and social and civil relations; and while making military service the first of duties, relieving it of hardship and privation.

The organization of volunteer force here contemplated may comprehend the whole maritime frontier, and be applicable, also, at the more populous points upon the inland borders.

This arrangement, while it might be an enduring one, would be the least expensive by far of any that would be efficient.

The days of exercise drill and encampment should be fixed and invariable, in order that they may the less interfere with the private occupations of the volunteers. During an impending attack, greater or less portions should be constantly at their posts; but still the service in the batteries would comprise but a very small portion of the year.

According to the value of the interest to be defended, and the extent of the works to be occupied, would be the rank of the chief command; which should be intrusted to an officer of the regular army, whose control might often be extended, advantageously, over a certain extent of seaboard to the right and left, constituting a maritime department.

The existing fortifications of the sea-coast—including a few useless remains of the revolutionary works, are due to three distinct epochs, namely: 1. Those that grow out of the political agitations attending the French revolution of 1789, and the wars consequent thereon. As all the principal harbors had to be protected at once, the contracted fiscal means of the country required that the works should be small; and they were also generally of a temporary character; but they proved sufficient. France, then a weak naval power, was moreover fully occupied at home, and in pressing her continental campaign.

2. On the approach of the war of 1812, the obvious inadequacy of existing forts led to large appropriations for fortifications, so that when the war broke out there was not a town of any magnitude upon the coast not provided with one or more batteries. Every place within the reach of an enemy's marauding expeditions called for this kind of protection; and there is no doubt that the defences supplied, saved the country from great losses. These defences of the *second system* were also small and weak, and being built for the sake of present economy, of cheap materials and workmanship, were very perishable. The government, aware of this weakness, called out to their support, during the war, vast bodies of militia at enormous expense—covering these troops with extensive lines of field-works.

3. The war with England being over, the government promptly entered upon a *permanent system* of coast defence, and to that end constituted a board of engineers, with instructions to make examinations and plans, subject to the revision of the chief engineer, and the sanction of the Secretary of War. And it is this, the *third system*, that has been ever since 1816 in the course of execution, and is now, as we shall see, well advanced.

Whenever the examinations of the board of engineers included positions for dock yards, naval depots, &c., naval officers of rank and experience were associated with them.

The board devoted several years uninterruptedly to the duty—presenting successive reports, and submitting, first, plans of the fortifications needed at the

most important points. Afterward, they were sufficiently in advance of the execution of the system to apply most of their time to the duties of construction, giving in occasionally additional reports and plans. In rare cases it has happened that plans have been made under the particular direction of the chief engineer, owing to the difficulty, at moments, of drawing the widely dispersed members of the board from their individual trusts.

The board and the chief engineer arranged the defences into classes, according to their view of the relative importance of the proposed works, in the order of time. This order has been generally well observed in the execution of the system, with the exception of some cases in which, by the action of Congress, certain forts were advanced out of the order advised by the board.

For many years grants for fortifications were made, annually, by Congress in a gross sum, which was apportioned according to the discretion of the President. But since March 3, 1821, the appropriations have been specific, the grants for each work being particularly stated. For many years every new fortification has, before being made the object of appropriations, been sanctioned by a special act of Congress upon recommendation of the military committee.

The classes are as follows, giving now merely the names of forts and places: the cost, armament, &c., of the several works executed or projected will be given at the end in proper tables.

Class A includes certain old works of the first and second systems. Some of these are already repaired, some undergoing repairs, and some subject to repair, should a war impend before better works shall have been substituted.

Fort Sullivan	Eastport, Maine.
Edgecomb	Wiscasset, Maine.
Preble	Portland, Maine.
Scammel	Portland, Maine.
McClary	Portsmouth, New Hampshire.
Constitution	Portsmouth, New Hampshire.
————	Gloucester, Massachusetts.
Pickering	Salem, Massachusetts.
Lee	Salem. Massachusetts.
Sewall	Marblehead, Massachusetts.
Independence	Boston harbor, Massachusetts.
Winthrop	Boston harbor, Massachusetts.
West Head Battery	Governor's Island, Massachusetts.
Southeast Battery	Governor's Island, Massachusetts.
————	New Bedford, Massachusetts.
Wolcott	Newport, Rhode Island.
Greene	Newport, Rhode Island.
Trumbull	New London, Connecticut.
Hale	New Haven, Connecticut.
Columbus	Governor's Island, New York.
Castle Williams	Governor's Island, New York.
South Battery	Governor's Island, New York.
Gibson	Ellis's Island, New York.
Wood	Bedlow's Island, New York.
Richmond	Staten Island, New York.
Tompkins	Staten Island, New York.
Battery Hudson	Staten Island, New York.
Morton	Staten Island, New York.
Fort Lafayette	Narrows, New York harbor.
Mifflin	Delaware river, Pennsylvania.
McHenry	Baltimore harbor, Maryland.
Madison	Annapolis, Maryland.

Fort Severn	Annapolis, Maryland.
Washington	Potomac river, Maryland.
Johnson	Cape Fear river, North Carolina.
Castle Pinckney	Charleston harbor, South Carolina.
Fort Moultrie	Charleston harbor, South Carolina.
Battery	Beaufort, South Carolina.
Fort Jackson	Savannah river, Georgia.
Marion	St. Augustine, Florida.
Barrancas	Pensacola, Florida.
St. Philip	Mississippi river, Louisiana.

Class B includes new works (third system) completed, or so nearly completed as to be able to use all or nearly all their batteries, viz:

Fort Warren	Boston harbor, Massachusetts.
Adams	Newport, Rhode Island.
Schuyler	Throg's Neck, New York harbor.
Hamilton	New York harbor, New York.
Monroe	Old Point Comfort, Virginia.
Macon	Beaufort, North Carolina.
Caswell	Oak Island, North Carolina.
Pulaski	Cockspur Island, Georgia.
Pickens	Pensacola, Florida.
McRee	Foster's Bank, Florida.
Morgan	Mobile Point, Alabama.
Pike	Rigolets, Louisiana.
Macomb (formerly Wood)	Chef Menteur, Louisiana.
Battery Bienvenue,	Bayou Bienvenue, Louisiana.
Tower Dupré,	Bayou Dupré, Louisiana.
Fort Jackson	Mississippi river, Louisiana.
Livingston	Barrataria bay, Louisiana.

Class C includes works now under construction, and more or less advanced, viz:

Fort Knox	Bucksport, Maine.
Delaware	Delaware river, Delaware.
Carroll	Soller's Point, Maryland.
Calhoun	Hampton roads, Virginia.
Sumter	Charleston harbor, South Carolina.
Clinch	Cumberland sound, Georgia.
Taylor	Key West, Florida.
Jefferson	Garden Key, Tortugas, Florida.
Redoubt of Fort Barrancas	Pensacola, Florida.
Fort Gaines	Dauphin Island, Alabama.

Class D includes works, the first to be commenced, arranged in geographical order, viz:

Fort at mouth of Kennebeck river, and Fort Scammel, (new,) Portland harbor, Maine.

Fort ———, (new,) Portsmouth, New Hampshire.

Fort Pickering, (new,) Salem; Fort ———, (new,) Jack's Point, Marblehead; works at Provincetown, and New Bedford, Massachusetts.

Fort on Rose island, Narraganset roads, Rhode Island.

Fort on Sandy Hook Point, New York.
Fort on Thomas's Point, Patuxent river, Maryland.
Fort at Proctor's Landing, Louisiana.
Works at Galveston bay, and Brazos Santiago, Texas.

Class E includes works to be commenced after those in *Class D*, in geographical order, viz:

New Fort Preble, Portland harbor Maine.
Works at Gloucester; Closing Broad Sound Pass, Boston harbor; works at Gurnet Point, Plymouth, Massachusetts.
Works at Cedar Point, Potomac river, Maryland.
Works at Georgetown, and in Port Royal roads, South Carolina.
Works on Tybee island, Savannah river, Georgia.
Tower at Pass au Heron, Alabama.
Fort at Ship island, Mississippi.
Works at Passa Cavallo, Matagorda bay, Texas.

Class F includes works to be commenced last of all, also in geographical order, viz:

Works at Eastport harbor, Machias, Mount Desert island, Castine, St. George's bay, Damariscotta bay, Broad bay, Sheepscot bay, Hog Island channel, (Portland harbor,) mouth of Saco river, mouth of Kennebunk river, York, Maine.

Works at Newburyport, Beverly, Nangus Head, (Salem,) Fort Sewall, (Marblehead,) Nantasket head, (Boston harbor,) redoubt on Hog island, (Boston haror,) Nantucket, Edgartown, Falmouth, Holmes Hole, Tarpaulin Cove, Massachusetts.

Works at Cananicut island, and works closing west passage of Narragansett roads, Rhode Island.

Fort Griswold, (New London,) works at mouth of Connecticut river, Fort Hale and Fort Wooster, (New Haven,) Connecticut.

Works for harbors and towns between New Haven and New York; works in Gardiner's bay, Long Island sound; works in Sag Harbor; fort on Wilkins's Point, Long Island; redoubt in advance of Fort Tompkins, Staten island, New York.

Fort at Delaware breakwater, Lewes; Fort opposite Fort Delaware, Delaware river, Delaware.

Fort on Elk river; works on Hawkin's Point, below Baltimore; fort on Point Patience, Patuxent river; works at St. Mary's, Potomac river, Maryland.

Works at Bald Head and Federal Point, Cape Fear river, North Carolina.

Works at mouth of Santee river, Bull's bay and other inlets, Stono sound, North Edisto sound, South Edisto sound, St. Helena sound, South Carolina.

Works at Wassaw sound, Ossabam sound, St. Catherine's sound, Sapelo sound, Doley inlet, Altamaha sound, St. Simon's sound, St. Andrew's sound, Georgia.

Works at Charlotte harbor, Tampa bay, Appalachicola bay, Appalachie bay, St. Joseph's bay, Santa Rosa bay, Florida.

Works at Perdido bay, Alabama.

Being arranged in the preceding classes, on the principles before stated, it will be seen that those places which are deemed to be least important in the system, and which may be postponed till all others are executed, constitute by far the most numerous class. Within this class (F) there are, no doubt, great differences as to the claim for defences, and in the course of years likely to elapse before any of them can be taken in hand, several may rise in the scale of relative importance.

There are also in class E differences of the same sort, and it is not unlikely

that before they can be commenced, at the rate the system has heretofore advanced, there may be interchanges between this and class F.

In class D, however, it is less probable that there will be a material change, as all the positions are important now, being designed to cover large towns or cities, or national establishments, or the outlets of valuable commerce or important roadsteads.

I proceed now to examine the coast in detail, proceeding geographically, beginning at the northeastern extremity and referring to accompanying tables. It may be well to observe here, once for all, that much confidence is not asked for the mere conjectures presented below as to the number and cost of the works assigned for the protection of the harbors which have not yet been surveyed. In some cases there may be mistakes as to the number of forts and batteries needed; in others errors will exist in the estimated cost.

Eastport and *Machias* may be mentioned as places that will unquestionably be thought to need defensive works by the time, in the order of relative importance, the execution of them can be undertaken by the government. There are several small towns eastward of Mount Desert island that may, at that period, deserve equal attention; at present, however, the places mentioned will be the only ones estimated for, and $100,000 will be assumed as the cost of each.

Class F—Mount Desert island, situated a little east of Penobscot bay, having a capacious and close harbor, affording anchorage for the highest class of vessels, and easily accessible from sea, offers a station for the navy of an enemy superior to any other on this part of the coast. From this point his cruisers might act with great effect against the navigation of the eastern coast, especially that of Maine, and his enterprises could be conducted with great rapidity against any points he might select. These considerations, added to the very great advantage, in certain political events, of our occupying a naval station thus advanced, whence we might act offensively, together with the expedience of providing places of succor on a part of the coast where vessels are so frequently perplexed in their navigation by the prevailing fogs, lead to the conclusion that the fortification, in a strong manner, of this roadstead may, before long, be necessary. A survey of this island was begun many years ago, but the party being called off to other duties it was never completed. The project of defensive works has not been made. The entire cost may be, as assumed by the engineer department some years ago, $500,000.

Class F—Castine.—It would seem to be impossible on this coast to deprive an enemy enjoying naval superiority of harbors, or prevent him using them as stations during a war, insular situations, which his vessels would render unapproachable, being so numerous; but it seems proper that such of these positions as are the sites of towns should be secured. During the last war, the English held the position of Castine for some time, and left it at their pleasure. It is probable a work costing about $50,000 would deter an enemy from again making choice of this position.

Class F—Penobscot bay.—Upon this bay, and upon the river of the same name flowing into it, are several flourishing towns and villages. Of the many bays which intersect the coast, the Penobscot is the one which presents the greatest number of safe and capacious anchorages. As before observed, a large portion of these harbors must, for the present, be left without defences, but the valuable commerce of the bay and river must be covered; and to afford a secure retreat for such vessels as may be unable to place themselves under the protection of the works to the east or west of the bay, the passage of the river must be defended. The lowest point at which this can be done without great expense, is opposite Bucksport, at the Narrows. *Fort Knox,* at this position, is now under construction, estimated at $500,000.

Class C—St. George's bay, Broad bay, Damariscotta, and Sheepscot.—West of the Penobscot occur the above-mentioned bays, all being deep indentations leading to towns, villages, and various establishments of industry and enterprise. The bays have not been surveyed, and of course no plans have been formed for their defence. $400,000 are assigned to the defence of these waters. The Sheepscot is an excellent harbor of refuge for vessels of every size.—(Class F.)

Kennebeck river.—This river (one of the largest in the eastern States) enters the sea nearly midway between Cape Cod and the mouth of the St. Croix. It rises near the source of the Chandiere, which is a tributary of the St. Lawrence, and has once served as a line of operations against Quebec. The situation and extent of this river, the value of its products, and the active commerce of several very flourishing towns upon its banks, together with the excellence of the harbor within its mouth, will not permit its defence to be neglected. The surveys begun many years ago, were never finished. The estimated cost of defences, as formally reported by the engineer department, was $300,000. Positions near the mouth will permit a secure defence.—(Class D.)

Portland harbor.—The protection of the town, of the merchantmen belonging to it, and of the ships-of-war that may be stationed in this harbor to watch over this part of the coast, or that may enter for shelter, (all of them important objects,) may be secured, as an inspection of the map of the harbor will show, by occupying Fort Preble Point, House island, Hog Island ledges, and Fish Point. If the two channels to the west and east of Hog island can be obstructed at small expense, (to decide which some surveys are yet necessary,) there will be no necessity for a battery on the ledge, and Fish Point need be occupied only by such works as may be thrown up in time of war. The expense, as now estimated, of the works planned for this defence, will be $155,000 for Fort Preble and $48,000 for House island; for Hog island channel, say $135,000.—(Classes A, D, E, F.)

In addition, there must be repairs immediately applied to the old works at Fort Preble, including the rebuilding of a sea-wall lately overthrown, at an expense of $7,500.

Saco, Kennebunk, and York.—Small works, comparatively, will cover these places; $75,000 is assumed as the aggregate cost.

Class F—Portsmouth habor and navy yard.—The only good roadstead or harbor, between Cape Elizabeth and Cape Ann, is Portsmouth harbor, within the mouth of the Piscataqua river. Line-of-battle ships can ascend as high as Fox Point, seven miles above the town. This situation, sufficiently commodious for a naval depot, should be maintained; but it is to be regretted that the bay to the south of Fox Point was not chosen as the site of the navy yard, instead of Fernald's island. Being where it is, it will be necessary, in time of war, to make some particular dispositions for the protection of the navy yard from an attack from the north shore of the river.

The position of Fort Constitution will certainly, and that of Fort McClary will probably, be occupied as the defence; though the works themselves should give place to those that would better fulfil the object. The other positions for forts or batteries, are Gerrist's Point, Fishing island, and Clarke's island, some, if not all, of which must be occupied. Surveys have been made and projects for the defence are now under the consideration of the board of engineers. The estimates have not been furnished, but there is reason for believing that the entire cost for fortifying this harbor will not fall short of $300,000.

Class D—Newburyport harbor.—The points forming the mouth of the harbor are continually changing, and it seems necessary, therefore, to rely, for the defence of the harbor, on works to be thrown up during a war. There is only a shoal draught of water. It is thought $100,000 will defend this harbor adequately.

Class F—Gloucester harbor.—The position of this harbor, near the extremity of Cape Ann, places it in close relation with the navigation of all Massachusetts bay, and imparts to it considerable importance. No surveys have yet been made, but it is believed that sufficient defence may be provided for $200,000.—(Class E.) Should there be any occasion for defensive works before the proposed new works can be commenced, an expenditure of $10,000 in repairs of the old fort will be required.—(Class A.)

Beverly harbor.—This harbor will be defended chiefly by a portion of the works designed for Salem. $50,000 in addition will secure it.—(Class F.)

Salem harbor.—The port of Salem is distant from Marblehead two miles, and separated therefrom by a peninsula. The occupation of the extremity of Winter island (where are the ruins of Fort Pickering) on one side, and Nangashead on the other, will effectually secure this harbor. Projects have been presented for this defence, estimated to cost $225,000.—(Classes D and F.) On a sudden emergency old Fort Lee may be put in an effective state for $2,000, and Fort Pickering for $5,000.—(Class A.)

Marblehead harbor.—Beside covering, in some measure, the harbor, of Boston, Salem and Marblehead possess an important commerce of their own, and also afford shelter for vessels prevented by certain winds from entering Boston or pursuing their course eastward. The proposed mode of defending Marblehead harbor consists in occupying, on the north side, the hillock which commands the present Fort Sewall, (which will be superseded by the new work,) and on the south, the position of Jack's Point. The two works will cost $318,000.—(Classes D and F.)

To repair old Fort Sewall which may be necessary if the new works are not soon begun, will require ten thousand dollars.—(Class A.)

Boston harbor.—We come, now, to the most important harbor in the eastern section of the coast, and considering the relations to general commerce and the interests of the navy, one of the most important in the whole Union.

After a careful examination of all the necessary conditions of such a problem the board of naval officers and engineers, in their joint report of 1820, gave this harbor a preference over all other positions to the east and inclusive of New York bay and the Hudson as the seat of the great northern naval depot; and the government, by the great additions and improvements that have from year to year been since made to the navy yard on the Charlestown side, have virtually sanctioned the recommendation of the board. But independent of the navy yard, Boston is a city of great wealth, and possesses an extensive and active commerce.

The old works defended merely the interior basin from attacks by water, but as it often happens that vessels enter Nantasket roads with a wind too scant to take them to the city, or are detained in President roads by light winds or an adverse tide, as the former especially is a very convenient anchorage whence to proceed to sea, and above all as Nantasket roads afford the best possible station for a blockading squadron, it was deemed indispensable to place permanent defences at the mouth of the harbor. The project of defence regards the existing works, with the necessary repairs and modifications, as constituting a second barrier.

Beside a permanent work now almost finished on George's island, it contemplates permanent works on Nantasket Head, and filling up the Broad Sound channel, so as to leave no passage in that direction for ships-of-war.

Until the best draught for steam vessels-of-war shall be well ascertained, it will not be safe to say to what depth the Broad Sound channel should be restricted, nor indeed can it be positively asserted that this description of vessels can be conveniently excluded by such means. Other vessels *can*, however, be thus excluded, and steam vessels passing this channel would still have to pass the inner barrier. The estimated cost of the works for this harbor is $1,354,573

Besides the works of a permanent character, it will be necessary in the beginning of a war to erect several temporary works on certain positions in the harbor and on the lateral approaches to the navy yard.—(Classes A, B, E and F.)

Plymouth and Provincetown harbors.—These harbors have a commerce of some consequence of their own, but they are particularly interesting in reference to the port of Boston. While these are undefended, an enemy's squadron blockading Massachusetts bay will have ports of refuge under his lee, which would enable him to maintain his blockade even throughout the most stormy seasons, knowing that the winds which would force him to seek shelter would be adverse to outward bound and fatal to such inward-bound vessels as should venture near the cape. Were the enemy deprived of these harbors he would be unable to enforce a vigorous investment, as he must be constrained to take an offing on every approach of foul weather. Our own vessels coming in from sea, and finding an enemy interposed between them and Boston, or being turned from their course by adverse winds, would, in case of the defence of these ports, find to the south of Boston shelter equivalent to those provided in the east at Marblehead, Salem, Gloucester and Portsmouth. Plymouth harbor has not been fully surveyed. Provincetown harbor has been surveyed, but the projects of defence have not been formed. The former, it is thought, may be suitably covered by a work of no great cost on Gurnett Point, while to fortify Provincetown harbor in such a way as to cover vessels taking shelter therein, and at the same time to deprive an enemy of safe anchorages, will involve considerable expense. Probably no nearer estimate can be formed at present than that offered by the engineer department some years ago, which gave one hundred thousand dollars to Plymouth and six hundred thousand dollars for Provincetown.—(Classes D and E.)

The coast between Cape Cod and Cape Hatteras differs from the northeastern section in possessing fewer harbors, in having but little rocky and a great portion of sandy shore, in its milder climate and clearer atmosphere; and it differs from all the other portions, in the depth and magnitude of its interior seas and sounds, and in the distance to which deep tide navigation extends up its numerous large rivers. The circuit of the coast, not including the shores of the great bays, measures about six hundred and fifty miles.

Martha's Vineyard sound.—To the south of Cape Cod lie the islands of Nantucket and Martha's Vineyard, which, with several smaller islands on the south, and the projection of Cape Malabar on the east, enclose the above-named sound. The channels through this sound being sufficient for merchant vessels, and one of the channels permitting the passage even of small frigates, are not only the constant track of coasting vessels, but also of large number of vessels arriving in the tempestuous months from foreign voyages. There are within the sound the harbors of *Tarpaulin Cove, Holmes Hole, Edgartown, Falmouth, Hyannis,* and *Nantucket,* besides small anchorages.

In addition to the many thousand vessels passing this water annually, of which there are sometimes forty or fifty (a portion containing very valuable cargoes) to be seen in the harbors awaiting a change of wind, there is supposed to be at least forty thousand tons of whaling vessels owned in the towns of this sound.

If the harbors just named are to be defended at all it must be by fortifications. There is little or no population except in the towns, and even this is believed to be entirely without military organization. A privateer might run into either of these harbors and capture, destroy, or levy contributions at pleasure. The use of the sound itself as an anchorage for vessels-of-war cannot be prevented by fortifications alone. Two hundred and fifty thousand dollars may perhaps suffice for the defence of all the harbors against the kind of enterprise to which they are exposed.—(Class F.)

New Bedford and Fairhaven harbor.—Projects and estimates have been

made for the defence of this harbor, on which lie two of the most flourishing towns in the eastern States, New Bedford being, as regards registered tonnage, the third harbor in the United States. Estimate $208,000.—(Class D.)

Buzzard's bay.—Interposed between the main and the island of Martha's Vineyard are the Elizabeth islands, which bound Buzzard's bay on the south. This bay covers the harbor of New Bedford, and might be used as an anchorage by an enemy's fleet, but it is too wide to be defended by fortifications.

Narraganset bay.—Some of the properties of this great roadstead have been stated in the preceding remarks.

The defence adopted for Narraganset roads must be formidable on the important points, because they will be exposed to powerful expeditions. Although the possession of this harbor, the destruction of the naval establishment, the capture of the floating defences, and the possession of the island as a place of debarkation and refreshment, should not be considered as constituting of themselves objects worthy a great expedition, they might very well be the preliminary steps of such expedition; and defences, weak in their character, might tempt rather than deter it; for although unable to resist his enterprise, they might be fully competent, after being captured and strengthened by such means as he would have at hand, to protect him from offensive demonstrations on our part.

There are besides, in the local circumstances, some reasons why the works should be strong. The channel on the eastern side of the island being permanently closed by a solid bridge, requires no defensive works; but this bridge being the upper end of the island, the channel is open to an enemy all along the eastern shore of the island. Works erected for the defence of the channel of the west side of the island cannot, therefore, prevent nor even oppose a landing on the eastern side. The enemy may, consequently, take possession, and bend his whole force to the reduction of the forts on the island, which cannot be relieved until a force has been organized, brought from a distance, conveyed by water to the points attacked, and landed in the face of his batteries; all this obviously requiring several days, during which the forts should be capable of holding out. To do this against an expedition of ten thousand or twenty thousand men demands something more than the strength to resist a single assault. Unless the main works be competent to withstand a siege of a few days, they will not, therefore, fulfil their trust, and will be worse than useless.

It must here be noticed that, although the works do not prevent the landing of an enemy on Rhode Island, they will, if capable of resisting his efforts for a few days, make his residence on the island for any length of time impossible, since forces in any number may be brought from the main, and landed under cover of the fire of the works.

To come now to the particular defences proposed for this roadstead. It must be stated that there are three entrances into Narraganset roads:

1st. The eastern channel, which passes upon the east side of the island of Rhode Island. This, as before stated, being shut by a solid bridge, needs no defence by fortifications, other than a field-work or two, which may be thrown up at the opening of a war.

2d. The central channel, which enters from sea by passing between Rhode Island and Conanicut island. This is by far the best entrance, and leads to the best anchorage; and this it is proposed to defend by a fort on the east side of the entrance, designed to be the principal work in the system. This work, called Fort Adams, is nearly completed. On the west side of the entrance it is proposed to place another work, and on an island, called Rose island, facing the entrance, a third work. It is also proposed to repair the old fort on Goat island, just within the mouth; and also old Fort Green, which is a little higher up on the island of Rhode Island.

3d. As to the western passage, three modes present themselves: first, by re-

ducing the depth of water by an artifical ledge, so as, while the passage shall be as free as it is now for the coasting trade, it shall be shut as to the vessels-of-war, including steam vessels; second, by relying on fortifications alone to close the channel; or, third, by resorting in part to one, and in part to the other mode just mentioned. Either is practicable; but, being the least expensive and most certain, the estimates are founded on the first. The total cost of the Narraganset defences is estimated at $1,699,000.—(Classes A, B, D, F.)

Gardiner's bay.—It is uncertain whether this harbor, which would be a very valuable one to an enemy investing this part of the coast, is defensible by fortifications alone. After it shall have been surveyed, it may appear that, from one or more positions, the whole anchorage may be controlled by heavy sea-mortars. In such a case, the defensive works would not be costly. If it be found expedient to fortify some particular portion of the bay, as an anchorage for steam batteries, (which, however, is not anticipated,) the expense would probably be as great as was anticipated some years since by the engineer department, viz: $400,000.—(Class F.)

Sag Harbor, New York, and Stonington, Connecticut.—Neither of these harbors has been surveyed with reference to defence. The first is possessed of considerable tonnage; and the second, beside being engaged in commerce, is the terminus of a railroad from Boston. $100,000 may be assigned to the first, and $200,000 to the other.—(Classes E and F.)

New London harbor is very important to the commerce of Long Island sound; and, as a port of easy access, having a great depth of water, rarely freezing, and being easily defended, it is an excellent station for the navy. It is also valuable as a shelter for vessels bound out or home, and desirous of avoiding a blockading squadron off Sandy Hook. The plan of defence includes the rebuilding of Forts Trumbull and Griswold—the former having been already done, very nearly—remaining expense estimated at $198,000.—(Classes A and F.)

Mouth of Connecticut river.—This river has been shown to be subject to the expeditions of an enemy. No survey has been made with a view to its defences. $100,000 is introduced here as the conjectural cost.—(Class F.)

New Haven harbor.—It is proposed to defend this harbor by improving and enlarging *Fort Hale*, and substituting a new work for the slight redoubt erected during the last war, called *Fort Wooster*. The expense of both may be set down at $90,000, exclusive of $5,000 for immediate repairs of old Fort Hale.—(Classes A and F.)

There are several towns between *New Haven* and *New York*, on both sides of the sound; none of them are very large as yet; still, most, if not all, are prosperous and increasing. Although in their present condition it might not be deemed necessary to apply any money to permanent defences, yet, as part of the present object is to ascertain, as near as may be, the ultimate cost of completely fortifying the coast, it seems proper to look forward to the time when some of these towns may become objects of predatory enterprises of some magnitude. Bearing in mind the probable increase of population in the meantime, and the situation of the places generally, it is thought that $200,000 will be enough to provide defences for all.—(Class F.)

New York harbor.—The objects of the projected works for the security of New York are to cover the city from an attack by land or sea; to protect its numerous shipping; to prevent, as far as possible, the blockade of this great port, and to cover the interior communication uniting this harbor with the Delaware.

There are two avenues to the city, namely, one by the main channel, direct from sea, and one by the sound.

The projected system of defence closes this last avenue at the greatest distance possible from the city, namely, at Throg's Point. The occupation of this point

will force the enemy to land more than twenty miles from the city on one side, and still further from the navy yard on the other.

A work now in progress and nearly finished at Throg's Point will prevent any attempt to force this passage. It will, as we have seen, oblige an enemy to land at a considerable distance from the object; and, as he will then be unable to turn the strong position afforded by Harlem river, the cover on the New York side will be sufficient.

But should he land on the Long Island side, he might, by leaving parties on suitable positions, with a view to prevent our crossing the river and falling on his rear, make a dash at the navy yard, having no obstacle in his front. To prevent this effectually, and also to accomplish other objects, a work should be erected on Wilkins's Point, opposite Throg's Point. This work, besides completing the defence of that channel, would involve a march against the navy yard from this quarter in great danger, since all the forces that could be collected on the New York shore might, under cover of this work, be crossed over to Long Island, and fall on the rear of the enemy, cutting off his communication with the fleet. The two works on Throg's and Wilkins's Points may therefore be regarded as perfectly protecting on that side the city and navy yard.

Against an attack by the main channel there are—

1st. The works in the vicinity of the city, which would act upon an enemy's squadron only after its arrival before the place. They consist of Fort Columbus, Castle Williams, and South Battery, on Governor's Island, Fort Wood, on Bedlow's island, and Fort Gibson, on Ellis's island.

It is necessary that these works be maintained, because, in the event of the lower barriers being forced, these would still afford a resource. It is a disadvantage of their positions, however, that the destruction of the city might be going on simultaneously with the contest between the forts and the fleets. They cannot, however, be dispensed with until the outer barriers are entirely completed, if even then.

2d. At the Narrows, about seven miles below the city, the passage becomes so contracted as to permit good disposition to be made for defence. On the Long Island side of the Narrows is *Fort Lafayette*, which is a strong water battery, standing on a reef at some distance from the shore, and immediately behind it, on the top of the bank, is a small but strong work, called *Fort Hamilton*. Some repairs being applied to these works, this position may be regarded as well occupied.

On the west or Staten Island side of the Narrows are the following works, all of which were erected by the State of New York, viz: *Fort Richmond*, which is a water battery; *Battery Hudson*, which is at some height above the water: *Battery Morton*, which is a small battery on the top of the hill, and *Fort Tompkins*, which is also on the hill, and is the principal work. All these works, as well as the site common to them all, are now the property of the United States, by purchase from the State of New York.

Batteries Hudson and *Morton* have been put in perfect order, and afford a formidable array of guns. *Fort Richmond*, which occupied the best position within the whole harbor for channel defence, had fallen entirely to ruin; it is now being reconstructed, and with the appropriation asked for in the estimates of last year might have been now ready for one tier of guns.

The nature and extent of repairs required by *Fort Tompkins* have not yet been settled, this not being deemed so pressing as a state of readiness in the batteries just mentioned. Besides these works, there has been projected for Staten Island an advanced *redoubt*, which, however, falls within the class of works (F) last to be erected.

With the Narrows thus defended, and the works near the city in perfect order, New York might be regarded as pretty well protected against an attack by water through this passage.

But there lies below the Narrows a capacious bay, affording good anchorage for any number of vessels-of-war and transports. An enemy's squadron being in that bay, into which entrance is very easy, would set a seal upon this outlet of the harbor. Not a vessel could enter or depart at any season of the year. And it would also intercept the water communication, by way of the Raritan, between New York and Philadelphia.

The same squadron could land a force on the beach of Gravesend bay, (the place of the landing of the British, which brought on the battle of Long Island in the revolutionary war,) within seven miles of the city of Brooklyn, of its commanding height, and of the navy yard, with no intervening obstacle of any sort.

This danger is imminent, and it would not fail, in the event of war, to be as fully realized as it was during the last war, when, on the rumor of an expedition being in preparation in England, twenty-seven thousand militia were assembled to cover the city from an attack of this sort. It is apparent that the defences near the city and those at the Narrows, indispensable as they are for other purposes, cannot be made to prevent this enterprise, which can be thoroughly guarded againt only by

3d. An outer barrier at the very mouth of the harbor. This would accomplish two objects of great consequence, namely, rendering a close blockade of the harbor impossible, and obliging an enemy who should design to move troops against the navy yard to land at a distance of more than twenty miles from his object, upon a dangerous beach, leaving, during the absence of the troops, the transports at anchor in the ocean, and entirely without shelter.

The hazard of such a land expedition would moreover be greatly enhanced by the fact that our own troops, by passing over Long Island under cover of the fort at Wilkins's Point, could cut off the return of the enemy to his fleet, which must lie at or somewhere near Rockaway. Time, distance, and the direction of the respective marches would make, very naturally, such a manœuvre a part of the plan of defence. Against an enemy landing in Gravesend bay no such manœuvre could be effectual, on account of the shortness of his line of march, as well as of its direction.

In view of these considerations, the board of engineers projected additional works, one for the *east bank*, and another for the *middle ground*, these positions being on shoals on either hand of the bar outside of Sandy Hook. Before determining on the works last mentioned the board went into much research, in order to ascertain whether these shoals were unchangeable, and it was thought to have been fully proved that there had been no material alteration in more than sixty years. This apparent stability of the shoals encourage the board to devise the project referred to.

More recent surveys have, however, discovered new, or rather other channels. If they, indeed, be *new* channels, they show a want of stability in the shoals that forbids any such structures as the batteries formerly contemplated. And whether new or not they would deprive these batteries of a material portion of their efficacy. Removing, then, these defences from this outer bar, they must occupy the position of *Sandy Hook;* at which they will afford a very good defence of the main channel, and prevent the entrance to or occupation of the lower bay for any hostile purpose whatsoever, and cover a secure anchorage there for our own merchantmen and privateers, and for our steam and sailing cruisers.

To recapitulate as to New York harbor. The security of the city of New York, Brooklyn, &c., and the navy yard requires, first, defences on the passage from the sound; namely, the completion of *Fort Schuyler* on Throg's Point, (Class B,) and the erection of a fort on Wilkins' Point (Class F)—cost of both $711,000; second, completion of repairs on works of Governor's island, Bedlow's island, and Ellis's island—estimated cost $42,689, (Class A;) third, repairs

of the works at the Narrows, including those formerly belonging to the State of New York—cost $326,834, (Class A and B;) and fourth, the erection of outer defences on Sandy Hook—estimated by the board of engineers to cost $1,200,000, (Class D;) the total cost will therefore be $2,332,523.—(Classes A, B, D, F,)

Delaware bay, Fort Delaware, Fort Mifflin, Delaware Breakwater.—The coast from the mouth of the Hudson to the Chesapeake, as well as that on the south side of Long island, is low and sandy, and is penetrated by several inlets; but not one, besides the Delaware, is navigable by sea-going vessels. The Delaware bay itself being wide and full of shoals, having an intricate channel, and being much obstructed by ice in the winter, affords no very good natural harbor within a reasonable distance of the sea.

The artificial harbor constructed just within the mouth of Delaware bay supplies this need, and must be securely fortified. No plans have, however, as yet been made with that object; and as to the probable cost, nothing better can now be done than to assume the conjectural estimate made some years since in the engineer department, namely, $600,000.—(Class F.)

The lowest point at which the bay is defensible is at Pea Patch island, about forty-five miles below the city of Philadelphia. A fort on that island, to replace the one destroyed by fire; a fort opposite the Pea Patch, on the Delaware shore, to assist in commanding the Delaware channel, and at the same time to protect the mouth of the Delaware and Chesapeake canal; a temporary work on the Jersey shore, to be thrown up at the commencement of a war, to assist in closing the channel on that side; together with floating obstructions, to be put down in moments of peril, will effectually cover all above this position—including Philadelphia and its navy yard, Wilmington, New Castle, the canal before mentioned, and the Philadelphia and Baltimore railroad.

The rebuilding of *Fort Delaware* was long delayed by difficulties attending the settlement of claims to the island (Pea Patch) on which it is to stand; these having been adjusted, the fort is in progress—the tedious and difficult process of forming a foundation with piles and grillage being concluded. In the meantime, *Fort Mifflin*, an old work, standing about seven miles below the city of Philadelphia had been put in good order.

The expense of Fort Delaware is, according to revised estimates, $580,000, and of the fort opposite, $521,000.—(Classes C and F.)

Chesapeake bay, Hampton roads, James river, Norfolk, and the navy yard.—The works projected for these are: first, a fort at Old Point Comfort—this is called *Fort Monroe;* second, a casemated battery called *Fort Calhoun*, in the Rip Rap shoals, opposite Old Point Comfort; and, third, a line of floating obstructions, extending across the channel from one of these works to the other.

Fort Monroe is of itself complete, but an advanced redoubt on the land side is unfinished, and considerable work is yet necessary to secure proper ventilation and the necessary dryness to the great powder magazines within the fort, designed as a principal depot of that material. Attempts to secure good water by an artesian well are still persevered in. Required to complete, $75,000.—(Class B.)

Fort Calhoun cannot yet be carried forward for want of stability in the foundation. The artificial mass on which it is to stand having been raised out of the water, the walls of the battery were begun some years since; but it was soon found that their weight caused considerable subsidence. On an inspection by engineer officers it was then decided to keep the foundation loaded with more than the whole weight of the finished work until all subsidence had ceased. The load had hardly been put on, however, before it was injudiciously determined to take it off, and begin to build, although the settling was still going on. Happily, a better policy prevailed before the construction was resumed, but not before the very considerable expense of removing the load had been incurred, and the further expense of replacing it rendered necessary. The subsidence

has now so nearly ceased that it is contemplated to resume the construction at an early day.—(Class C.) Required to complete, $729,332.

It may be expedient in time of war, by way of providing interior barriers, to erect batteries on Craney island, at the mouth of Elizabeth river, and to put in condition and arm Old Fort Norfolk, which is just below the city.

Harbor of St. Mary.—The central situation (as regards the Chesapeake) of this fine basin, its relation to the Potomac, its depth of water, and the facility with which it may be defended, indicate its fitness as a harbor of refuge for the commerce of the Chesapeake bay, and as an occasional, if not constant, station during war of a portion of the naval force. A survey has been made, but no project has been formed. The Engineer Department some years ago conjectured that the cost of defences in this harbor might amount to $300,000.—(Class F.)

Annapolis harbor.—Fort Severn has been put in an efficient condition, and repairs have been advanced on *Fort Madison;* these will be continued until that work also shall afford an efficient battery.—(Class A.) Estimated at $30,000.

Harbor of Baltimore.—The proximity of the city to Chesapeake bay greatly endangers the city of Baltimore. In the present state of things an enemy, in a few hours march, after an easy landing, and without having his communication with his fleet endangered, can make himself master of that great emporium of commerce. There are required for its security two forts on the Patapsco, one at Hawkin's Point, and the other opposite that point; these being the lowest positions at which the passage of the Patapsco can be defended. Besides the advantages that will result of obliging the enemy to land at a greater distance, thereby gaining time by delaying his march, for the arrival of succor, and preventing his turning the defensive positions which our troops might occupy, it will be impossible for him to endanger the city by a direct attack by water.

The operations on *Fort Carroll*—the work occupying the extremity of Soller's flats, (opposite Hawkin's Point,)—are proceeding with all the rapidity allowed by the appropriations. Estimate, $865,000.—(Class C.)

The work on Hawkin's Point belongs to class F, and is estimated to cost $376,000.

The present *Fort McHenry, Redoubt Wood,* and *Covington Battery* should be retained as a second barrier. The first-mentioned is now in good condition, and the repairs required for the others may be applied at the beginning of a war.

Mouth of Elk river.—The completion of the line of water communication from the Delaware to the waters of the Chesapeake makes it proper to place a fort somewhere near the mouth of Elk river, in order to prevent an enemy from destroying, by a sudden enterprise, the works forming this outlet of the canal. There have been no surveys made with a view to establish such protection, which is estimated at $50,000.—(Class F.)

Cities of Washington, Georgetown, and Alexandria.—Fort Washington covers these cities from any attack by water, and will oblige an enemy to land at some eight or ten miles below Alexandria, should that city be his object, and about twice as far below Washington. It will also serve the very important purpose of covering troops crossing from Virginia, with a view to fall on the flanks of an enemy moving against the Capitol from the Patuxent or the Chesapeake. The repairs on this work have been completed.—(Class A.)

Cedar Point, Potomac river.—But all these objects would have been better fulfilled had the work been placed at Lower Cedar Point. As it is, however, the contemplated works being constructed in the Patuxent, and the militia of the surrounding country in a due state of preparation, an enterprise against Washington would be a hazardous one. As giving complete security to the towns in the district, covering more than sixty miles in length of the Potomac; the river terminus of the great railroad from the south, and a large tract of country lying between the Potomac and the Patuxent; the work on Cedar Point should not

be omitted. There have been no surveys made of the ground, nor projects of the fort, which, in a conjectural estimate of the engineer department, was set down at $300,000.—(Class E)

Patuxent river.—The more effectually to protect the city of Washington from a sudden attack by troops landed at the head of navigation in the Patuxent, and to provide additional shelter for vessels in the Chesapeake, a fort has been planned to occupy Point Patience and another to occupy Thomas's Point, both a short distance up the river. The work on *Thomas's Point* is estimated at $259,000, and the work on *Point Patience* estimated to cost $246,000.—(Classes D and F.)

It will be perceived that the system of defence for Washington contemplates, first, defending the Potomac on Cedar Point, and maintaining a second barrier at Fort Washington; second, defending the mouth of the Patuxent. This particular arrangement not having been always understood, a few words are added in explanation.

During the last war there was no fort in the Patuxent, and the consequence was that the British approached by that avenue and occupied the whole river as high as Pig Point, nearly fifty miles from its mouth, and less than twenty miles from the Capitol; while, in consequence of there being no forts in the Potomac, they occupied that river as high as Alexandria, inclusive; by this latter occupation perfectly protecting the left flank of the movement during its whole advance and retreat. Both flanks being safe, the British had nothing to fear except from a force in front; and that this risk was not great, in the short march of less than twenty miles from the boats, was proved by the issue.

On the ninth day from that on which the fleet entered the Chesapeake the English army was in possession of the Capitol, having penetrated nearly fifty miles beyond the point of debarkation. On the twelfth day from the time of landing, the troops were again on shipboard, near the mouth of the river. This attack, exceedingly well conceived and very gallantly executed, owed its success entirely to the want of defences, such as are now proposed.

Let us suppose both rivers fortified as recommended, and an enemy landed at the mouth of the Patuxent. If now he attempt this enterprise, his march would be prolonged by at least four days—that is to say, it will require more than sixteen days, during which time he will be out of communication with his fleet as regards supplies and assistance.

The opposition to his invasion will begin at the landing, because our troops having now nothing to fear as to their flanks, either from the Potomac or Patuxent, will dispute every foot of territory; and although he should continue to advance it must be at a slower rate. While he is thus pursuing his route toward Washington, the forces of Virginia, brought by railroad to the mouth of Aquia creek, will be crossing the Potomac and concentrating at Port Tobacco, or some position between that place and Fort Washington, preparatory to falling on his flank and rear. This would seem to be conclusive, for it is difficult to conceive of troops persevering in an expedition when every moment will not only place them further from succor but greatly increase their need of it. Railroads reach from near the crossing places of the Potomac to the very heart of the country south, and a very few days would bring forward a large force, all of which would arrive upon the rear of the enemy.

It has been said that if shut out of the Patuxent the enemy might land between the mouth of that river and Annapolis, and thence proceed against Washington. But the same difficulties belong to this project, and a new difficulty is added. The Virginia forces arrive as before, and assail his flank, either between the Potomac and Patuxent or between the Patuxent and the Chesapeake; and there is, besides, the Patuxent for the enemy to cross, both in going and returning—itself a formidable military obstacle.

It is said, also, that the landing may be made in the Potomac; but this only

proves that the system animadverted on had not been studied, it being a fundamental principle of the system that such landing must be prevented by fortifying the river as low down as possible.

The southern coast, stretching from Cape Hatteras to the southern point of Florida, is invariably low, and for the greater part sandy, much resembling the coast from the above-mentioned cape to Montauk Point, on the east end of Long Island. A ridge of sand, here and there interrupted by the alluvion of the rivers, extends through its whole length. This ridge, in certain portions, lies on the main land; while in others it is divided therefrom by basins or "sounds" of various width and depth, and is cut up into islands by numerous channels, which connect these interior waters with the sea. Wherever this sand ridge is interrupted, its place is occupied by low and marshy grounds, bordering the principal and the many lesser outlets of the rivers.

Ocracoke inlet, N. C.—The shallowness of the water on the bars at this inlet effectually excludes all vessels-of-war—at least, all moved by sails. But as this is an outlet of an extensive commerce, and as, through this opening, attempts might be made in small vessels, barges, or the smaller class of steam vessels, to destroy this commerce, or to interrupt the line of interior water communication, timely preparation must be made of temporary works, equal to defence against all such minor enterprises.

Beaufort harbor, N. C.—A work called *Fort Macon* has been erected for the defence of this harbor. It is in a very efficient condition, though some slight additional work is needed, both for the fort itself and for the preservation of the site, which is acted upon violently by the sea. Successful impediments to this action have been resorted to, which require a little extension, however, and continual care. Estimate, $3,000.—(Class B.)

Mouths of Cape Fear river, N. C.—The defence of the main channel of Cape Fear requires, in addition to *Fort Caswell*, (now completed,) on Oak island, another fort on Bald Head. And the defence of the smaller channel will require a redoubt on Federal Point. The battery, magazine, block-house, &c., at Smithville, should remain as accessories. *Fort Caswell*, Oak island, $7,000.—(Class B.) *The fort on Bald Head* (class F) will require $180,000. The *redoubt on Federal Point* (class F) will require $18,000; and the battery, &c., called *Fort Johnston*, at Smithville, (class A,) $5,000.

Georgetown harbor, S. C.—The first inlet of any consequence south of Cape Fear river is at the united mouths of the Waccamaw, Pedee, and Black rivers, forming Georgetown harbor, which is a commodious and capacious bay, having sufficient water within, and also upon the bar near the mouth, for merchant vessels and small vessels-of-war. A survey of this harbor was begun many years ago, but never completed, and no projects for defence have been made. It is probable that a work placed near Moscheto creek, or on Winyaw Point, would give adequate strength, at the cost of about $250,000.—(Class E.)

Santee river and Bull's bay.—About ten miles south from Georgetown are the mouths of the Santee, the largest river in South Carolina. It is not known whether the bars at the mouth of this river have sufficient water for sea-going vessels. The same uncertainty exists as to the depth into Bull's bay. It may be sufficient to consider these, and the other inlets between Georgetown and Charleston, as calling for small works capable of resisting boat enterprises, and to assign as the cost $100,000. Should they prove to be navigable for privateers, they will require a larger expenditure.—(Class F.)—$100,000.

Charleston, S. C.—This city, situated at the junction of the Ashley and Cooper rivers, is about five miles, in a direct line, from the sea. Between it and the ocean there is a wide and safe roadstead for vessels of any draught. Upon the bar, lying three or four miles outside of the harbor, there is, however, only water enough for smaller frigates and sloops-of-war. On the southwest side of

the harbor is James's island, in which are several serpentine passages, more or less navigable for boats, barges, and small steam vessels; some of them communicate directly with the sea and Stono river. Whappoo cut, the most northerly passage from the Stono to Charleston harbor, enters Ashley river opposite the middle of the city.

Interior natural water communications exist, also, to the southwest of Stono river, connecting this with North Edisto river; the latter with South Edisto and St. Helena sound; this, again, with Broad river; and, finally, this last with Savannah river.

On the north side of the harbor of Charleston lies Sullivan's island, separated from the main by a channel navigable only by small craft. On the northwest side of this island is an interior water communication which extends to Bull's bay, and even beyond, to the harbor of Georgetown.

From this sketch it is apparent that it will not do to restrict the defences to the principal entrance of the harbor.

The lateral avenues must also be shut. And it is probable that accurate surveys of all these avenues will show that the best mode of defending them will be by works at or near the mouths of the inlets, as the enemy will be kept thereby at a greater distance from the city; the lesser harbors formed by these inlets will be protected, and the line of interior water communication will be inaccessible from the sea.

No position for the defence of the principal entrance to Charleston harbor can be found nearer to the ocean than the western extremity of Sullivan's island. This is, at present, occupied by *Fort Moultrie*—a work of some strength, but by no means adequate to its object; its battery being weak, and the scarp so low as to oppose no serious obstacle to escalade. How far this work, by a modification of its plan and relief, may be made to contribute to a full defence of the harbor, has not yet been determined. But so long as it is the only work at this, the principal point of defence, it must be kept in good condition for service, and no alterations that will disturb this efficiency should be undertaken.—(Class A.)

On a shoal nearly opposite Fort Moultrie a new fort has been well advanced, which will have a powerful cross-fire with *Fort Moultrie*. This is called *Fort Sumter*.—(Class C.) To complete this fort will require, it is estimated, $150,000.

In the upper part of the harbor is *Castle Pinckney*, on Shuter's Folly island. This requires some repairs, estimated at $800.—(Class A.)

Stono, North Edisto, and South Edisto.—All these must be fortified, at least in such a manner as to protect these inlets from enterprises in boats or small vessels. To that end $50,000 may be assigned to each.—(Class F.)

St. Helena sound.—The proper defences cannot be pointed out till the sound shall have been surveyed. Although there is supposed to be no great depth of water on the bar, it is known to be navigable for the smaller class of merchantmen and for steamboats, and to have a navigable communication with the head of Broad river, or Port Royal—intersecting the interior navigatiou between Charleston and Savannah. The estimate is $150,000.—(Class F.)

Broad river, or Port Royal roads.—The value of this capacious roadstead, as a harbor of refuge, depends upon the depth that can be carried over the bar; on the distance of this bar beyond the line of coast; and on the means that may be applicable of lessening the danger of crossing it. This is supposed to be the deepest bar on the southern coast. Should there prove to be water enough for frigates, and should it be practicable to make the passage over the bar safe and easy by the erection of light-houses on the shore, and lights or other distinct guides on the bar, this harbor, situated within sixty miles of the city of Charleston, and twenty of Savannah river, intersecting the interior water communication between these cities, thereby securing the arrival of supplies of every

kind, would possess a high degree of importance not only as a harbor of refuge, but also as a naval station.

The survey of the exterior shoals, constituting the bar, should be made with the greatest care and all possible minuteness. Only when this shall have been done can the true relations of this inlet to the rest of the coast be known, and on this relation the position and magnitude of the required defences will depend. For the present the estimate made some years ago by the engineer department is adopted, namely, $300,000.—(Class E.)

Savannah, and mouth of the Savannah river, Georgia.—Mention has been made of the natural interior water communication along the coast of South Carolina. A similar communication extends, south from the Savannah river, as far as the St. John's, in Florida. Owing to these passages, the city of Savannah, like Charleston, is liable to be approached by other avenues than the harbor or river; and, accordingly, its defence must have relation to these lesser, as well as to the great channels.

The distance from the mouth of Wassaw, or even the Ossabaw sounds (both to the southward of Savannah river) to the city is not much greater than from the mouth of the river; and an enterprise may proceed the whole distance by water, or part of the way by water, and part by land, from either inlet or from both. As in the case of like channels in the neighborhood of Charleston, it cannot now be determined where they can be defended most advantageously. It is hoped, however, that the localities will permit the defences to be placed near the inlets, because, thus placed, they will serve the double purpose of guarding the city of Savannah and covering these harbors, which, in time of war, cannot but be very useful.

The defence of Savannah river is not difficult. A fort on *Cockspur island*, lying just within the mouth, and, perhaps for additional security, another on Tybee island, which forms the southern cape at the mouth of the river, would prevent the passage of vessels up the channel, and cover the anchorage between Tybee and Cockspur.

Old Fort Jackson, standing about four miles below the city, must be maintained as a second barrier, both as respects the main channel and the passages which come into the river from the south, which last would not be at all controlled by fortifications on Cockspur or Tybee. *Fort Jackson* is accordingly undergoing the repairs and modifications necessary to give the proper strength and efficiency. Estimated to cost $45,000.—(Class A.)

Fort Pulaski, a new work situated on Cockspur island, is, in all the most important matters, finished. Some further work has to be done, however, on the dikes of the island, on barracks, and quarters, and storehouses, and in the construction of an advanced battery. Estimated to cost $35,000.—(Class B.)

To fortify *Tybee island* may require $120,000.—(Class E.)

Wassaw sound, Ossabaw sound, St. Catharine's sound, at the mouth of Medway river; Sapelo sound, Doby inlet, Altamaha sound, at the mouth of Altamaha river; St. Simon's sound, at the mouth of Buffalo creek; St. Andrew's sound, at the united mouths of the Scilla and Santilla rivers; and Cumberland sound, at the mouth of St. Mary's river.—All these communications with the ocean are highly important as regards the line of interior navigation, and several of them as affording access to excellent harbors. The last and one or two others are known to be navigable to the largest sloops-of-war and merchantmen, and some of the others are but little inferior as regards depth of entrance or safety of anchorage.

Fort Clinch, a work now in course of erection at the mouth of *Cumberland sound*, is a most important contribution to the defence of this, the most southern of the Georgia entrances. Estimated to cost $180,000.—(Class C.)

All the above-named openings, *except that into Cumberland sound*, have to

be surveyed. Some of them are probably easily defensible by forts and batteries, while others may need the aid of floating defences.

Nothing better can now be done than to assume $200,000 as the average cost of defending each of the eight entrances, giving a total of $1,600,000.—(Class F.)

St. Augustine, Florida.—This most southern of all the harbors of the Atlantic, and the key to the eastern portion of Florida, is accessible to the smaller classes of merchantmen, to privateers, and to steam vessels, and requires a certain amount of protection from attack by water. It is believed that adequate protection has been given by repairs bestowed upon the water battery of the old Spanish fort, *(Fort Marion.)*—(Class A.)

SEA-COAST FROM CAPE FLORIDA TO THE MOUTH OF THE RIO GRANDE.

Fort Taylor, at Key West, is in a good state to be brought speedily into efficiency; the walls have been raised up out of the water almost to the sills of the lower embrasures; and with the sum asked for in the last estimates, the lower tier of embrasures might be got ready for the armament in a short time. Estimated to cost $805,000:—(Class C.)

Fort Jefferson, Garden key, Tortugas.—This fort, which will perfectly command the admirable harbor lying in the heart of this group of keys, is advancing without the slightest impediment. The outer or counter-scarp wall first executed, because necessary to prevent the flooding of the island in gales of wind, has been completed, and labors are now bestowed on the main scarp. Estimated at $989,862.—(Class C.)

Turning now to the shore of the Gulf, we find a portion, namely, from Cape Florida to Pensacola, that has never been surveyed with particular reference to the defence of the harbors. Within this space there are *Charlotte harbor, Tampa bay, Apalachicola bay, Apalachie bay, St. Joseph's bay,* and *Santa Rosa bay.* Nothing better can now be done than to assume for these the estimate formerly presented by the engineer department, viz: $1,000,000 for all.—(Class F.)

It may be remarked, as applying to the whole Gulf coast, that, from the relative geographical position of this part of the seaboard and the country interested in its safety, from the unhealthiness of the climate, nature of the adjacent country, and mixed character of the inhabitants, it will be some time before that portion within supporting distance, whose welfare may be endangered by an enemy, will be competent of itself to sustain a serious attack from without. Upon the Atlantic seaboard the Alleghanies crowd the people down upon the shore, every important point on the coast being surrounded by a population dense now, and every day rapidly increasing in numbers; while the ocean and the interior parallel communications transmit rapid aid to the right and left. The coast of the Gulf, however, is thinly peopled in itself, is remote from succor from behind, and is almost inaccessible to lateral assistance. Those reasons, therefore, which tend to establish the necessity of an organized, permanent, and timely system of defence for the whole seaboard of the United States, apply to this part of it with peculiar force.

We now pass on to the remaining points of defence on the Gulf.

Pensacola bay.—The upper arms of this considerable bay receive the yellow water or Pea river, Middle river, and Escambia river. The tributaries of the last interlocking with the Alabama and Chattahouchie, seem to mark the routes whereby, at some future day, canals will convey a part of the products of these rivers to Pensacola; while the qualities and position of the harbor, and the favorable nature of the country, have already marked out lines of railroad communication with a vast interior region.

Santa Rosa sound extends eastward, from the lower part of the bay, into

Santa Rosa bay. On the west the lagoons of Pensacola, Perdido, and Mobile bays, respectively, interlock in such a manner as to require but a few miles of cutting to complete a navigable channel from the first to the last named bay, and thence through an existing interior water communication to the city of New Orleans.

Pensacola bay has rare properties as a harbor. It is now accessible to frigates, and there is reason to hope that the bar may be permanently deepened. The bar is near the coast and the channel across it straight and easily hit. The harbor is perfectly landlocked and the roadstead very capacious. There are excellent positions within for repairing, building, and launching vessels, and for docks and dock yards, in healthy situations. The supply of good water is abundant. The harbor is perfectly defensible. These properties, in connexion with the position of the harbor, as regards the coast, have induced the government to select it as a naval station and place of rendezvous and repair.

An excellent survey has been made of the bay of Pensacola, sufficing to form the scheme of defence for the town and harbor. Regarded, however, as an important naval station and place of rendezvous and repair which it now is, further surveys, extending a greater distance back from the shores, delineating accurately the face of the country, and showing the several avenues by land and water, are found to be necessary.

The defences of the water passage as projected are nearly completed.

Fort Pickens, on St. Rosa island, is finished.

Fort McRee, on Foster's island, is also finished; as is *Fort Barrancas,* on the site of an old Spanish fort. An old Spanish *water battery* has been thoroughly repaired, and placed in connexion with the last-named fort, and considerable progress has been made on a *redoubt,* in advance of the same fort. Permanent barracks in the same vicinity are about half finished.

The site of Fort McRee was, a few years since, seriously threatened by the abrasion of a new outlet from the lagoon that lies just behind it; but this danger has been averted, and by the erection of a low rampart exterior to the fort a permanent security against any recurrence of the danger will be provided, and place for a heavy additional battery acting on the channel will be prepared. At a future day it will be proper to extend this exterior protection. At present it is designed to execute only that part lying over or nearly over the outlet that was lately so threatening and so difficult to close. Estimated at $204,000.—(Classes A, B, C.)

Perdido bay.—This bay is intimately related to Pensacola and Mobile bays, both as regards security and intercommunication, and should be carefully surveyed with a view to those objects. It must be fortified, and the cost may be $200,000.—(Class F.)

Mobile bay.—The plan of defence for this bay requires a fort on Mobile Point, and another on Dauphin island. *Fort Morgan,* at the first-mentioned position is a finished work, in an efficient condition, but requiring, in the way of barracks and quarters, storehouses, &c., for the accommodation of its garrison, some further expenditures. These improvements are in progress—estimated at $30,000.—(Class B.)

Fort Gaines, on Dauphin island, has been authorized by Congress, and the expenditure of the appropriation awaits only the settlement of title to the site, as to which there are supposed to be no remaining difficulties. Estimate, $180,000.—(Class C.)

New Orleans and the delta of the Mississippi.—The most northern water communication between the Mississippi and the Gulf is by the passage called the *Rigolets,* connecting Lake Borgne and Lake Pontchartrain. The next is the pass of *Chef Menteur,* also connecting these lakes. Through these passages an enemy entering Lake Pontchartrain would, at the same time that he intercepted all water communication with Mobile and Pensacola, be able to reach

New Orleans from the southern shore of the lake; or he might continue onward through Lake Maurepas, Amité river, and Iberville river, thereby reaching the Mississippi at the very head of the delta; or, landing within the mouths of the Chef Menteur, he might move against the city, along the edge of the Gentilly road.

To the southwest of Chef Menteur, and towards the head of Lake Borgne, is *Bayou Bienvenue*, a navigable channel, (*the one followed by the English army in the last war,*) not running quite to the Mississippi, but bounded by shores of such a nature as to enable troops to march from the point of debarcation to the city.

These avenues are defended by *Fort Pike*, at the Rigolets; by *Fort Macomb*, formerly Fort Wood, at Chef Menteur; by a small fort at *Bayou Bienvenue*, and by a tower at *Bayou Dupré*.

The defences of the Mississippi are placed at the Plaquemine turn, about seventy miles below New Orleans—the lowest position that can be occupied. *Fort Jackson* is on the right bank, and *Fort St. Philip* a little higher up on the left.

Forts Pike, Macomb, Battery Bienvenue, and Tower Depré, have been put in the most efficient state, and will perfectly accomplish the objects for which they were designed. They will still need some small expenditures in reference to security of site, extension of accommodations, &c. *Fort Jackson* is also in good condition as to its batteries, but will be much improved in that respect on the completion of an outwork now in hand. It needs also more barrack room. *Fort St. Philip* is a very old fort, and much dilapidated. Its position is so commanding and advantageous as to require the fort to be put in the best state, and much has been done to that end within a few years; still more is necessary for the fort itself and its dependencies; and all the barracks, quarters, and storehouses have yet to be built. Estimated at $111,500.—(Classes A and B.)

The most western avenue by which New Orleans is approachable from the sea passes on the west side of the island of Grande Terre into Barrataria bay, which is an excellent harbor for a floating force, guarding the coasting trade on that side of the Mississippi. From this bay there are several passages leading to New Orleans.

Fort Livingston has been erected on the west end of Grande Terre island. This fort is kept from entire completion to await the cessation of a slight subsidence which has been going on for some time. It could be finished with the means now applicable at any moment by a few weeks' work.—(Class B.)

Proctor's Landing, Lake Borgne.—This position, which was overlooked in the original project for the defences of the city of New Orleans, has been already adverted to. A small battery, enclosing a tower, standing on the shore, would effectually close this avenue. The tower could not be carried by assault, nor the battery while protected by the tower. No landing could be made under its fire, and there is no other spot for a landing, owing to the swampy nature of the ground, but the site of the battery. Estimated at $100,000.—(Class D.)

Several times in this report we have alluded to circumstances which would demand the employment of floating defences in addition to fixed defences upon the shore. We have here an instance in which that kind of defence would be very useful. Fortifications will enable us to protect New Orleans even from the most serious and determined efforts of an enemy; but, owing to the great width of some of the exterior passages, we cannot by fortifications alone deprive an enemy of anchorages, (especially that of Chandeleur island,) nor cover entirely the exterior water communication between the Rigolets and Mobile. We must, therefore, either quietly submit to the annoyance and injury that an enemy in possession of these passages may inflict, or avert them by a timely preparation of a floating force adapted to their peculiar navigation, and capable, under the shelter of forts, of being always on the alert, and of assuming an

offensive or defensive attitude, according to the designs, conduct, or situation of the enemy.

A floating force of this nature would be very useful in overlooking the coast eastward of New Orleans, especially the portion just mentioned, extending from the Rigolet (Fort Pike) to Mobile bay. And in connexion with the active service of such a force, and as a further defence of the approaches to New Orleans from that quarter, a fort on Ship island would be important. It would cover an excellent anchorage for the defensive flotilla and for other cruisers. With this refuge at one end of the base of operations, and at the other the anchorage between Pelican island and Dauphin island, guarded by works at the eastern end of the latter, a light steam squadron might, without being much exposed, be very effective.

Projects have not yet been made for works on Ship island, but it may be estimated that an adequate fort would cost about $200,000.—(Class E.)

In this age of great improvements in the means of locomotion, it would be unwise to decide, without pressing need, on the details of the floating force required at certain points on the Atlantic and Gulf of Mexico coasts—perhaps even on the nature of the moving power. Although the probability undoubtedly is that the power will be steam, genius may in the interim devise something still better than steam.

And I may here remark, in relation to the preparation of steam vessels for warlike purposes generally, that wisdom would seem to direct a very cautious and deliberate progress. Every new vessel may be expected to surpass in important particulars all that had preceded, and to surpass the more, as each succeeding vessel should be the result of careful study and trial of the preceding.

It may be considered unreasonable to expect that steam itself will give way to some agent still more potent, and at the same time not less safe and manageable. But it certainly is no more than probable that steam vessels now under construction may be regarded almost as incumbrances within ten years.

A deliberate advance in this branch of naval construction is recommended the more, by our ability to construct these vessels in large numbers, when about to be needed, the timber being collected in the meantime.

COAST OF TEXAS.

In November, 1845, a special board of engineer officers was appointed to examine the coast of Texas in relation to its defence. Their report, submitted in February, 1846, was to the following effect:

The coast from the Sabine to the Rio Grande is about three hundred and seventy-five miles in extent. It is composed for nearly the whole distance of long, narrow islands and peninsulas, which lie parallel to the main land, forming several bays and lagoons, the inlets to which exhibit channels generally only suitable to the smaller classes of vessels.

Galveston bay is the most important one on the coast. Besides a number of bayous and small tributaries, it receives the waters of the river Trinity. This river is said to be navigable for six hundred miles for steamers of a light class, and, when improved, this navigation will doubtless be extended. The harbor is represented as being undoubtedly the best on the coast, the bar at the entrance having also the greatest depth of water. The charts submitted by that board show a depth of nine feet at low water and twelve feet at high water.

A permanent work is proposed for the defence of this harbor, of the class of that constructed on Grande Terre island, Barrataria bay. Its estimated cost is three hundred thousand dollars.—(Class D.) The construction of some Martelle towers along the shore and across the island is deemed essential to the defence of the "Swash" channel and to the security of the town, Brazos Santiago. The board deem this harbor of equal importance with that of Galveston:

it has not much capacity, but is the only one in the vicinity of the Rio Grande. The bay at the pass has eight feet water.

The trade of the Rio Grande and of its dependent country passes overland thirty miles to Point Isabel, and from thence issues from the Brazos Santiago. The depth of water over the bar at the mouth of the Rio Grande being only four feet, admits the passage of very small vessels not suited to the purposes of commerce.

With reference, then, to the trade of the Rio Grande, and to a point from which military supplies could with the greatest facility be sent to the frontier, the defence of the Brazos Santiago is deemed by the board of equal importance with that of Galveston, and they recommend a permanent work, of the size, character, and cost of the one proposed for the latter place, estimated at three hundred thousand dollars.—(Class D.)

Matagorda bay.—It is deemed due to the extensive country washed by the rivers tributary to this bay, that its entrance should be defended. The difficulties, however, attending that entrance, and the navigation of the bay up to Matagorda and La Vacca, would seem to lessen, in a military point of view, the importance of its defence as compared with that of Galveston and the Brazos Santiago; but as a very good harbor for vessels drawing no more than eight feet of water is exhibited within the bay at Porto Cabello, and as it would afford convenient rendezvous for the light flotillas of an enemy, it is considered that a permanent work of secondary importance to those proposed for Galveston and the Brazos Santiago should be constructed for its defence. A small work, mounting some twenty-five guns, and estimated to cost $175,000, is accordingly proposed.—(Class E.) The remaining inlets on the coast, either from the shallowness of the water, the comparatively little value of the harbors themselves, or the nature of the country immediately depending upon them, are deemed to require, at present, no other defence than that of a temporary character. They would depend upon the ultimate opening of a line of inland navigation, considered practicable between the Sabine and the Rio Grande; and the necessary work would be thrown up only in time of war.

GENERAL SUMMARY.

It may be of convenience to have here a summary of the principles contended for in the preceding remarks, and of the essential points contained therein.

1. Assuming that we may have wars with nations in possession of extensive naval means, we must consider ourselves likely to be attacked wherever there are objects tempting to an enemy, either from the spoil he might hope to gather, or the injury that through them he might hope to inflict. We must also consider that the power of the attack will be proportioned to the value of the object; and that, consequently, the means of defence should be of corresponding strength.

2. The mode of defence proper to our circumstances, as sustained by the consideration presented in the preceding remarks, and others of analogous nature; and as exemplified by the present, as well as by the former practice of all nations having an exposed seaboard, is believed to be a system of permanent fortifications, consisting of work adapted respectfully in their power to the value of the object covered, and applied, in times of peace, severally, in an order of time also fixed by the relative importance of the objects.

3. It is just this mode of defence that has been, to a great extent, built up in this country since the war 1812, and that should be carried to completion as rapidly as the means of the treasury will allow. The points that are *most* valuable are already, to a very important extent, covered by these defences. But among many points that are valuable, all are not equally so; while, for exam-

ple, New York has had much done for it, Baltimore has had little, and New Bedford—the *third* city in the Union for registered tonnage—almost nothing.

More than four thousand heavy guns may, however, as has before been said, now be mounted for the defence of places which it was necessary *first* to guard, in permanent fortifications that are equal to any in the world, in their respective grades, and placed, moreover, in the most effective positions. These are in, what are called in this report, classes A and B, namely, old works repaired and new ones completed, or nearly so, at a total cost of $16,756,708.

Then follows the class of works in progress, (class C,) of which the remaining expenditures are estimated at $5,028,194.

And then the class D, next to be commenced, in which there is no work that can be dispensed with, as must be evident on consulting the list, page 92. The cost of class D is estimated at $4,083,000.

Then follows the class E, next in importance, of which the estimated cost is $2,235,000.

As to those in hand, all have received the approbation of the government and Congress, and not one of those comprised in any other class can be begun without the particular sanction of both.

The last class, marked F, the most numerous of all, cannot be begun for many years, at any rate, and then only as the several positions shall, in the view of Congress, have risen to an adequate degree of importance. The estimate for that class is $11,829,000.

4. Though facility of communication with the interior of the country, by railroads, would be an advantage in all cases where an enemy might land and conduct operations for two, three, or more days, there are few such positions that now have, or are likely to have, the advantage of such communications. Generally, the points of the coast attained by railroads are not points at which the people are deficient in numbers, but where they most abound; and besides, the attacks to which the coast will be liable, will be almost universally sudden attacks—attacks without warning—attacks that must be settled, one way or the other, before relief could come, even by railroad, and to which railroads could not supply relief, even were there time—men not being wanted to resist these attacks, but heavy guns, whether afloat or ashore.

The use of existing railroads, or of any railroad likely to be constructed, cannot, in general, therefore, affect materially a system of forts and batteries upon the sea-coast. There may be particular instances of partial benefit, but none is likely to occur wherein their use could justify the reduction of the power of fortifications otherwise necessary, much less the dispensing with such works altogether.

5. The application of steam to vessels-of-war is believed to act detrimentally to the defence of the sea-coast by opening new avenues of approach, and also by the suddenness and surprise with which attacks may fall upon any point. The first augments the number of the defensive works, and the second requires them to be at all times—at the opening of the war as well as during its continuance—in a state of perfect readiness for action. With the large steam navies now kept in commission by naval powers, there would be no state of transition between peace and war—no time for new defences to be prepared, nor for substituting new expedients even if any such would answer.

On the other hand, the use of steam vessels as a reliance for coast defence is attended with all the objections inherent in other modes of defence with vessels, and with some of the objections exaggerated. The objections that are inevitable are, inordinate expense and the perishable nature of the preparation; and to these are to be added uncertainty as to their proper state of readiness, and as to their sufficiency when ready. Steamers should in no case, therefore, take the place of shore batteries, when the use of the latter is not forbidden by

local peculiarities. As auxiliaries of fortifications they will always be useful, however, and as substitutes in the cases just supposed indispensable.

6. No improvements or inventions of modern times tend in any degree to lessen the efficiency of fortifications as means of coast defence, while the principal one, namely, the firing of shells from guns, unquestionably augments their relative power.

NORTHERN FRONTIER.

The Secretary of War presents another interrogatory (the fourth) in the following words: "How far the increase of population on the northern frontier, and of the mercantile marine on the northern lakes, obviates or diminishes the necessity of continuing the system of fortification on those lakes?"

The system of defence for these lakes recommended by the joint board in 1840 (see Doc. 206, page 100) comprised the following works:

1. *Fort Brady*, at the straits between Lake Superior and Lake Huron. Estimated cost of repair $75,000

2. *Fort Mackinac*, at the junction of Lake Michigan with Lake Huron. Estimated cost of repair 50,000

3. *Fort Gratiot*, at the outlet of Lake Huron. Estimated cost of repair 50,000

Note.—All these are old works, long occupied by United States troops, and it is designed to give them further strength and means of accommodation for garrisons.

4. A new fort and barracks near Detroit. Estimated cost of construction (original) $250,000
Amount expended 171,755

Amount required to complete 66,000

5. Defensive works and barracks at Buffalo. Estimated cost of construction $150,000
Amount expended 116,500

Amount required to complete 33,500

6. Repair of old Fort Niagara. Estimated cost of repair $84,027
Amount expended 59,027

Amount required to complete 25,000

7. Repairs of old Fort Ontario. Estimated cost of repair $83,013
Amount expended 78,013

Amount required to complete 5,000

Note.—These two are old works, the former having been always garrisoned, I believe.

8. And a fort at the outlet of Lake Champlain. Estimated cost of construction $411,497
Amount expended 187,355

Amount required to complete 224,142

These, it was thought, should be executed as soon as the means of the treasury would allow.

And it was recommended in the above report, and in others on the same subject, that at the approach of war with England—

9. Works should be placed at the mouth of the Genesee river.
10. A fort should be built at Sackett's Harbor.
11. Another at a narrow part of the St. Lawrence river.
12. That a large barrack establishment should be prepared at Plattsburg.
13. Stone house, &c., at the head of the Kennebec and Penobscot.
14. A fort at Calais, on the St. Croix; and,
15. A large barrack establishment near Albany.

These last mentioned preparations for war (Nos. 9, 10, 11, 12, 13, 14, and 15) may still be left (as was designed) to be reconsidered at any time that such a certainty may seem to impend.

Nothing has yet been done to *Forts Brady, Mackinac*, or *Gratiot*, and, though the maintenance of these forts in a war with England would undoubtedly be necessary, they may, with less damage than the others, be left as the last, to receive all the additional strength their situations demand. In the meantime the indispensable repairs that small appropriations will accomplish should be provided for; for instance, a part of the very old wall of Fort Mackinac having fallen down, a small grant was asked last year for its repair, a request that is this year repeated.

Fort Wayne, the new fort near Detroit, has, since the date of the report above referred to, been built and is now in perfect condition, and there remains therein only the re-erection of officers' quarters destroyed by fire just after being completed, and the addition of some other quarters, storehouses, &c., the barracks being very nearly finished; the remaining expense being estimated at $66,000.

Fort Ontario, at Oswego, has also been finished, with several entirely new quarters, storehouses, barracks, &c., together with a long sea-wall, found to be necessary to preserve the site. Only small grants, for slight repairs, will be needed for this work for some time, but of which one for nine hundred dollars is now asked. This fort is not a permanent one, and, if required to be maintained many years hence, may need repairs somewhat extensive.

Fort Niagara has received extensive repairs, and is in a defensible condition; but the expenditure having been restricted to the fortification proper and to the magazine, the accommodations for the garrison, which are remains of the old French work, are in a bad condition, and need repair for the health and comfort of the troops. A new hospital was hardly finished, a year or two ago, when it was destroyed by fire, originating in another part of the fort; which accident, with the similar one at Fort Wayne mentioned above, shows that economy even exacts that buildings be made fire-proof. The effect of this fire upon some palisading, as well as upon the hospital, and the decay of some wooden gun platforms, make a small appropriation necessary. The old stone houses will have to be rebuilt, though they may be kept up for a short time, and some enlargement must be given to quarters; all which will, perhaps, involve an expense of $25,000.

At Buffalo, *Fort Porter* has been built, and is finished. It is a tower enclosed by a battery. It commands the entrance into Niagara river, and also the shore and anchorage in front of the city of Buffalo, nearly up to the mouth of Buffalo harbor. There is connected with the fort a good house for officers' quarters that was purchased with the site. There will be needed, further, another battery and tower, to be placed at or near the mouth of the harbor, at an additional cost, beyond the means in hand, of, say, $33,500.

Such barracks as may be wanted at a future day may there be hired or hastily erected.

Fort Montgomery, outlet of Lake Champlain.—This fort is not less than half finished; indeed, considering the difficulties and expense that attended the making a foundation of piles under the whole fort, it may be said to be two-thirds finished. The remaining expense may be estimated at $224,142.

We see, therefore, that of all the *new works* designed to be executed on the northern frontier, in anticipation of a war, there remains to be expended—

At Fort Wayne, Detroit, for buildings		$66,500 00
At Buffalo, for tower and battery		33,000 00
At Fort Montgomery, outlet of Lake Champlain		224,142 00
		323,642 00
On repairs of old works there is now, or soon will be, needed—		
At Fort Niagara, say	$25,000 00	
At Fort Ontario, say	5,000 00	
At Fort Mackinac, say	20,000 00	
		50,000 00
Making a total of		373,642 00
If we add to this sum the estimates, before given, for—		
Fort Brady	$75,000 00	
Fort Gratiot	50,000 00	
Fort Mackinac, the balance after the above provision	30,000 00	
		155,000 00
There will be a grand total for the northern frontier of		528,642 00

I thought it best to show first the actual condition of things on the northern frontier, before proceeding with a reply to the specific inquiries of the honorable Secretary of War.

The great length to which this report has extended, notwithstanding that a sincere desire to keep it within more reasonable limits has induced me to omit considerations that I wished to adduce, must now restrict my remarks, referring to some previous reports wherein the subject of our northern defences have been specially treated—I mean, particularly, first, a report of a special board of engineer officers, addressed to the Secretary of War, December 27, 1838; second, a letter from the chief engineer to the Secretary of War, of February 20, 1839; and, third, a report to the Secretary of the Navy, from a joint board, consisting of Commodore Morris and the chief engineer, dated November 18, 1845.

It is undoubtedly true that the augmented population and extended navigation of the upper lakes will afford great resources in that quarter to the nation, on the occurrence of a war with England, and there seems to be a feeling with many that in such an event a great flood of armed men would sweep across the whole surface of Canada, effacing all organized resistance, and trampling down all opposition. That this is posible may not, I suppose, be questioned, but that it will not be done is certain, if there remain in our councils firmness to resist all such fruitless impulses, and wisdom to see and pursue the proper course.

All Upper Canada might be thus swept, from Lake Superior down to Montreal, without a real conquest of the country, and, indeed, without gaining any advantage of vital moment. Kingston, in all that distance, is the only place at which anything like a serious impression would be made upon the military means of defence; and, as the flood should pass away, all that part of the province, if loyal before, would not be made less so by the desolation spread around.

No solid resistance would be made to such an inroad, and there being no fortifications worth defending in a way to compromise the safety of the regular troops, these would retreat before it, accumulating, as they receded, into the lower province, where would be found, supported by the most formidable natural obstacles, not the force of Canada, merely, but also the army and navy of England, in daily communication with the mother country, and where would have to be fought and won the battles which alone would secure a conquest. Any place of operation that contemplates overrunning Upper Canada, or making such attacks upon it, would be costly, beyond all calculation, in life and treasure, and unnecessary and fruitless after all. A country is conquered by concentrated efforts of well appointed armies upon vital points, often a single point—a levy en masse is the great resource of defence; a well prepared and well appointed army is the only reliable, as it is also, by far, the cheapest means of invasion.

If we send a single army into Canada by Lake Champlain and the peninsula lying between the Richelieu and St. Lawrence, and possess ourselves of Montreal, or of both shores of the St. Lawrence at any place below that city, where the channel can be commanded, all the wide extent of the British possessions above that point will be paralyzed, being entirely cut off, not only from the mother country, but also from all relief from Lower Canada, including Quebec, and from the provinces of New Brunswick and Nova Scotia. To do this a great battle must be gained—probably on the peninsula just mentioned, and, being gained, must be followed up by other victories, ending in the capture of Quebec—the last barrier that can be manned by the British. The policy of the defence will be, while keeping an eye upon any preparations for the attack just mentioned, by every resort, device, and effort, to agitate the frontier above, and thereby draw the attention, and, as far as possible, the means of our government to the defence of that frontier. They will generally expose there but few regular troops, but will collect volunteers, militia, and Indians in as large numbers as possible. They will detach thither bodies of ship-carpenters and sailors, and make great efforts to obtain and keep a naval ascendency, if not everywhere, at least wherever possible.

This was exactly the policy followed by the English during the war of 1812, and with full success. By judgment, perseverance, and activity, they kept the strength of this country so attenuated by stretching along a frontier of many hundred miles, that no great effort could be made anywhere; and upon the true point of attack reduced the efforts to means so feeble as to end only in discomfiture and disgrace. Our government had its attention always, more or less, turned in the right direction, and several times attempted to assemble armies on the Champlain frontier, but always withdrew these troops, giving way to clamor raised by other frontier districts that were assailed, or believed themselves endangered by British enterprises.

The British took Chicago, Mackinac, Detroit; besieged Fort Meigs; attacked Fort Sandusky; captured Black Rock and Buffalo two or three times; they fought the battles of Chippewa and Lundy's Lane; besieged and assaulted Fort Erie; they captured Fort Niagara and Fort Ontario; attacked Sackett's Harbor; took Ogdensburg, French Mills, Malone, &c., &c. All these certainly for no design or hope of conquest and extended occupation, but for the purpose of keeping up an excited state of feeling and an energetic warfare that would fully occupy this government. When in 1814 the assembling of six or seven thousand men at Plattsburg, under General Izard, seemed to threaten their weak point, the English forthwith began to concentrate their best troops in opposition, and no sooner was that general withdrawn to re-einforce the Niagara frontier than this English force dashed forward in hopes, by profiting of our weakness, to make themselves masters of the lake, and thereby cover for an indefinite period their vital point.

If there has been a great increase of power and reasoning in the United

States since the war of 1812, there has on the other hand been a great change of the same sort in the population, and also in the military means of Canada.

The Rideau canal opens a communication between Montreal and Lake Ontario, and the Welland canal between Lakes Erie and Ontario; and good roads and canals from Toronto, on Lake Ontario, to Lake Huron, all deep in the heart of the country, and not to be intercepted except by victorious armies. All the light draught war steamers of Great Britain can be sent fully armed, provisioned, and manned, directly from sea up to the very head of Lake Ontario; and we can now do nothing whatever, and shall be unable to do anything, except by the erection of a fort at some commanding point on the St. Lawrence to stop this transit. War steamers or other armed vessels, though of smaller size, may branch off from this main line into Lake Champlain, and others into Lake Erie. Besides, the number of British merchant steamers on Lake Ontario and the St. Lawrence, above Montreal, is greater than of American steamers; and between Montreal and Quebec there are several of the largest size, so that as many troops as they might desire to send could be transported in twenty-four hours from Quebec to Montreal; in two or three days to Kingston; and in three or four days to the head of Lake Ontario and the shores of Lake Erie. They have, moreover, a strong new fortification at Kingston which will require a siege to reduce, and which, with other defences, covers a large naval depot and also the outlet of the Rideau canal. Under these and other circumstances favorable to the power of Canada, the relative numbers of the people of the two countries afford no measure of relative strength for military purposes, especially at the beginning of a war; and even as to numbers we shall find the difference less when we call to mind that the people of the British islands are quite as near in time to this frontier as our more remote States, and that the help those islands will send will consist of war steamers and regiments of disciplined troops. It will not be with Canada alone that we shall have to contend, but with Canada and Great Britain—the latter a nation always ready with great military power, and prepared with naval means to throw a large army upon the lake shore as soon, at least, as we should be ready to face them with our undisciplined levies.

Our plan of operations being to move forward from the foot of Lake Champlain as a base, we should not permit any demonstration nor any real attacks from Canada upon the frontier above, to direct us, although great efforts will undoubtedly be made to that end all along the line from Montreal to Lake Superior.

We have not now, and without great and costly efforts could not acquire, the naval ascendency on Lake Ontario and on the St. Lawrence. We could not attain to it at all without putting our building establishments under cover of fortifications.

By the time one half dozen merchant steamers on Lake Champlain could be prepared and armed, the English might pour into the lake through their canals adequate naval means, supplied by Montreal, Quebec, and the St. Lawrence, to make the struggle for the mastery on that lake a doubtful one at least. If they could think it possible that we should fail to fortify the outlet of the lake, the contemplated enlargement of the canal from Chambly to St. Johns, (about twelve miles,) whereby war steamers could pass into that lake as they now may into Lake Ontario, would undoubtedly be executed.

Upon Lakes Erie, Huron, and Michigan we unquestionably have a great superiority in naval preparation, which is likely moreover to increase from year to year; and if timely care be taken to arm and man a suitable portion of these, the mastery may be retained.

If there be truth and force in the foregoing statements and opinions, a war with England will begin with the naval supremacy against us, along the whole range of the St. Lawrence and the head of Lake Ontario; with means in the enemy's hands of contending for at least, if not seizing, a like supremacy on

Lake Champlain, with the power of throwing troops, mechanics, and sailors in a few days upon the shore of the upper lakes, and with the strongest inducements to keep up then an active warfare. The possession of a naval depot at Penetanqueshin, on Lake Huron, which it is understood can readily be made a strong place, and where there is now one war steamer, and the easy communication with it from Toronto would allow enterprises to be prepared and sent at favorable moments against the establishments and commerce of the upper lakes. But an anchorage under the defence of *Fort Mackinac* as a place of rendezvous and watch for our own steam squadron, and a place of refuge in case of disaster, would be very important in counteraction of any such project. *Fort Gratiot*, when strengthened, would prevent any such hostile expedition from passing through the strait in Lake St. Clair and endangering Detroit, while it would cover any of our vessels retreating to that end of the lake. *Fort Wayne, near Detroit*, will prevent the passing of any vessel between Lakes Huron and Erie, while it would become the rallying point of the militia of that region assembled to meet threatened attacks of a serious nature, or to organize expeditions into the opposite territory, and its garrison would protect the neighborhood from all predatory inroads.

Even on Lake Erie, where we might have the means of arming and manning any number of steamers, we should derive important if not indispensable aid from batteries, duly prepared at Buffalo. The English now own several good steamers on this lake, and by the aid of the Welland canal they could bring in others, and they could also soon build a number within harbors secure and near; so that we may reasonably look for vigorous efforts of that nature if we leave our great plains uncovered. The proposed battery and tower, in addition to the one already constructed at Buffalo, will place that city out of danger of conflagration, bombardment, or contribution, a security otherwise to be attained only by keeping it constantly covered by a number of war steamers greater than the enemy can bring. There can be no comparison as to the expense of the two modes, while the naval defence will be subject to all the chances of absence, at the moment of need, on other duty; of being enticed away by other real or fictitious attacks; of being dispersed for a time by tempests, &c. Other important places on the lake shore will be distant comparatively, not under constant supervision from the Canada side, less valuable, and for these and other reasons may, with less damage, be left to such defences as temporary and hastily prepared works may supply. The two batteries at Buffalo would cover the whole face of the shore, so that no vessel could lie within reach of the city without coming under their fire, and the towers would guard these guns from being spiked in any attempts at surprise.

On Lake Ontario, with the exception of some slight repairs, all has been done that has been proposed for the present. But we have seen that we shall here be under the naval command of the English, and must, therefore, make timely preparation to avert the more serious consequences.

On the St. Lawrence we should, as soon as possible after a war becomes probable, erect a work to command its navigation; and we ought, also, then to do something for the protection of Ogdensburg.

The obvious advantages afforded by our occupation of the outlet of Lake Champlain would seem to require nothing to be added to the preceding remarks. I may say, however, that the fort now under construction, and more than half finished, will give to us the control of the lake beyond all doubt, and retain it in spite of the energetic efforts that its great importance might induce an enemy to make for its capture or reduction. It will keep all the shores of the lake, as well as its surface, free from any hostile irruption, because no expedition could penetrate, on either side, without exposing itself to be cut off by troops landed in its rear, and it will secure the inappreciable advantage of taking the armies destined to the conquest of Canada, together with all their supplies, up to the

very frontier with all the velocity of steam; it will bring all re-enforcements with the same rapidity and certainty; and, moreover, in case of reverses it will establish a limit to retreat—a place of shelter, refreshment, and a base for renewed operations.

It is necessary to consider that this point is so near to the point of concentration of the English, in the case we have supposed, that no temporary work could be prepared in time, or if prepared would be competent to resist, unless very strong, extensive, and defended by a large body of troops.

If these defences be not carried to completion we may look with certainty to see the English widen and deepen the Chambly canal, a trivial operation, and at the very beginning of a war throw a squadron of war steamers into the lake, from which they could not be driven but by infinite cost and much sacrifice of life and loss of time.

I forbear to enlarge further on this and other important matters connected with this frontier system of defence, again taking the liberty, if the subject be deemed worthy of further pursuit, to refer to the special reports before mentioned, and also to that in document 206. In these reports will be seen views in relation to the embodying militia forces in support of the lake frontier, and also in support of the frontier eastward of Lake Champlain, as well as other ideas supposed to have an important bearing on the topic.

No speculations are ventured as to a possible change in the political condition of Canada. Until Great Britain shall willingly relinquish her dominion we may be certain that all her energies will, if necessary, be exerted in its maintenance; and whether this be for ten years or for a century, the defensive system herein advocated, as dictated by forecast and prudence, should be steadily adhered to; for, up to the moment of relinquishment, if such moment ever arrive, the defences may be growing more and more necessary.

The considerations detailed in the preceding remarks, and others with which it does not seem necessary further to burden this long report, permit me to make no other reply to the fourth inquiry of the Hon. Secretary of War than that no change has occurred, or is likely to occur, that will justify the relinquishment of the system of defence for the northern frontier, of which system the portion designed to be first prepared and to be permanent *is now nearly completed.*

Statement of the number of fortifications which have been built, including those nearly completed under the general system adopted after the war with Great Britain, the number in progress of construction, and the number not yet commenced, but proposed to be erected; and exhibiting, also, the States and Territories in which the several forts are situated, or are to be located; when they were commenced, when completed, and when they are expected to be finished; the number and calibre of the guns mounted or to be mounted; the estimated cost of construction and armament, respectively; the amount expended for construction or repair, and an estimate of the amount required to finish or construct; and the total amount required to be appropriated to complete the armament.

Designation of the works and State in which located.	Garrison in peace—companies.	Garrison in war—number of men.	When commenced.	When completed.	Estimated cost of construction or repair.	Amount expended for construction or repair.	Amount required to complete construction or repair.	ARMAMENT, INCLUDING 100 ROUNDS OF AMMUNITION FOR EACH PIECE.														Estimated cost of armament, including one hundred rounds of ammunition.
								42-pounders.	32-pounders.	24-pounders.	18-pounders.	12-pounders.	Field pieces.	Flank howitzers.	8-inch howitzers, heavy.	8-inch howitzers, light.	13-inch mortars.	10-inch mortars, heavy.	10-inch mortars, light.	8-inch mortars, light.	10-inch stone mortars.	Cohorns.	Total number of guns.	
1. Fort Brady, Michigan*	1	300	.....	.....	$75,000	.....	$75,000	....	...	....	10	5	3	8	2	..	...	....	....	2	...	5	35	$18,953
2. Fort Mackinac, Michigan*	1	300	.....	.....	50,000	.....	50,000	....	10	....	....	5	3	10	2	..	...	2	...	2	....	5	39	25,613
3. Fort Gratiot, Michigan*	1	300	.....	.....	50,000	.....	50,000	...	10	....	..	5	3	10	2	....	....	2	...	2	....	5	39	25,613
4. New Fort Barracks, n'r Detroit, Mich.*	1	300	1841	.....	250,000	$171,755	66,000	....	....	23	20	16	....	...	4	....	....	....	....	....	....	....	63	44,724
5. Works at Buffalo, including Fort Porter, New York*	1	300	1842	.....	150,000	116,500	33,500	...	....	44	16	....	....	....	4	....	....	....	....	....	....	....	64	51,208
6. Repair of old Fort Niagara, New York*	1	300	1840	.....	84,027	59,027	25,000	...	....	..	16	...	...	5	....		....	....	....	....	....	....	21	12,961
7. Repair of old Fort Ontario, New York*	1	300	1839	.....	83,013	78,013	5,000	...	...	....	20	10	....	....	...	....	....	....	....	...	....	....	30	18,610
8. Fort at the outlet of Lake Champlain, New York*	1	500	1841	.....	411,497	187,355	224,142	....	64	12	....	..,.	3	40	32	.	....	2	4	....	2	5	164	132,386
	8	2,600	... .	.....	1,153,537	612,650	528,642	....	84	79	82	41	12	73	46	....	....	6	4	6	2	20	455	330,068

* Expected to be completed within about one year after the amounts required to complete shall have been appropriated.

The inquiries embodied in the resolutions of the House of Representatives, and those specified in the letter of the Hon. Secretary of War calling for this report, have seemed to me to require that the several topics should be gone into with some minuteness. Certain of these, moreover, having been often of late placed before the public mind in erroneous lights, according to my judgment, it appeared to be a duty of my office to press such considerations as might be calculated to satisfy the inquiries of the unprejudiced and uncommitted of the necessity of a permanent system of defence, and of the adaptation to our wants and circumstances of a system of fortification.

Were it not for the length and diffusion of the preceding remarks, of which I am fully conscious, but which I have not time to condense, I should have introduced other considerations of like tendency and of much weight.

As it is, in the full knowledge of our remaining weakness at many important points, and under a deep conviction of the grave consequence likely to flow from tardiness in the prosecution of the system, or interruption to its progress, I feel constrained to invoke for it, with all admissible earnestness, the prompt and liberal support of the Executive and Congress.

At the same time, I only fulfil a further duty in warning the same authorities against relying on means that, though inordinately expensive, will be but temporarily of use, and insufficient while they last, instead of those adopted by all enlightened, experienced nations as relatively cheap as permanent, and in all respects adequate.

COAST OF THE PACIFIC.

Several works of defence will be required for this coast. The special board of engineers organized for its examination, whose province it is to project the necessary works, have but just commenced their sessions, and have had the time to examine and determine on the location of a single fort only. This is on the southern side of the entrance to San Francisco bay, where a work will undoubtedly be required.

For the other points of the coast no positive information as to the locality, size, and cost of works can now be offered. The joint commission of naval and engineer officers who recently made a reconnoissance of the coast, without the means of minute examination, suggest several points that will probably require defence in the course of time. These positions they designate as requiring fortifications to be commenced immediately, namely, *San Francisco bay*, *San Diego harbor*, and the *mouth of Columbia river;* and the department is disposed to rely confidently upon the opinion of the intelligent officers composing the commission.

Several other points they also suggest as ultimately requiring defence, submitting estimates of cost. The number of these works, as well as the cost, must be taken as conjectural until a thorough examination can be made.

The localities specified, with approximate cost of works, are as follows:

"The commission of navy and engineer officers constituted by the President for the purpose of making an examination of the coast of the United States lying on the Pacific ocean, with reference to points of defence and occupation, for the security and accommodation of trade and commerce, and for military and naval purposes," * * * * state:

"The several works required for the defence of harbors, roadsteads, rivers, sounds, &c., upon the coast of the United States on the Pacific will be shown in the following tables, arranged in the order of their relative importance, in three classes, with approximate estimates of their cost; each class being shown in a separate table, and the heading being applicable to all the tables."

Sites of fortifications.	Their denominations.	Approximate estimate of cost.	
		On the Atlantic.	On the Pacific.
FIRST CLASS.—TO BE BUILT WITHOUT DELAY.			
South shore San Francisco bay, channel entrance	Battery	$400,000	$1,600,000
North shore San Francisco bay, channel entrance	do	400,000	1,600,000
Alcatrazas island, San Francisco bay	do	150,000	600,000
Cape Disappointment, mouth of Columbia river	Redoubt, with battery	200,000	800,000
Point Adams, mouth of Columbia river	Fort, with battery	300,000	1,200,000
Punta de Guianos, San Diego	Battery, with coverface	400,000	1,600,000
Total		1,850,000	7,400,000
SECOND CLASS.—TO BE BUILT AT A LATER PERIOD.			
Santa Catalina island	Fort, with battery	$400,000	$1,600,000
Entrance to Humboldt harbor	Redoubt and battery	150,000	600,000
Entrance to Klamet harbor	do	150,000	600,000
Neat island, (Scarborough harbor)	do	100,000	400,000
San Pedro roadstead, (island)	do	100,000	400,000
Monterey roadstead	do	150,000	600,000
Santa Barbara roadstead	Battery and tower	50,000	200,000
Estero bay	do	50,000	200,000
Entrance of Umpqua or of Cahons	do	50,000	200,000
Bodega roadstead, (island)	Battery	50,000	200,000
Total		1,250,000	5,000,000
THIRD CLASS.—TO BE BUILT AT A REMOTE PERIOD.			
Port Lawrence, (Admiralty inlet)	Redoubt and battery	$150,000	$644,000
Port Townsend, Straits of Fuca	do	150,000	600,000
Port Discovery, do. West cape	do		
Port Discovery, do. East cape	do		
Port Discovery, do. Protection island	do		
Narrows of Puget's Sound	do	150,000	600,000
Entrance of Hood's canal	do	150,000	600,000
Gray's harbor, mouth of Chiboby river	Battery and tower	50,000	200,000
Point José, San Francisco bay	Temporary battery	20,000	80,000
Angel island, San Francisco bay	do	20,000	80,000
San Pedro	do	10,000	40,000
Santa Barbara	do	10,000	40,000
Total		710,000	2,840,000
Aggregate		3,810,000	15,240,000

In conclusion, I have to refer to a tabular statement of all the fortifications erected, under construction, or intended to be built on the Atlantic and Gulf frontier of the United States, said fortifications being arranged in classes, according to the order of importance, and, within each class, according to the geographical order of the States in which they are situated.

The statement exhibits the amounts expended, or to be expended, for fortifications and for the armament; as also a specification of the armament.

Very respectfully, your most obedient servant,

JOSEPH G. TOTTEN,
Brevet Brig'r General and Col. of Engineers.

Hon. C. M. CONRAD, *Secretary of War.*

E.

Letter to the Secretary of the Navy.

WAR DEPARTMENT, *Washington, June* 17, 1851.

SIR: I herewith enclose a copy of certain resolutions adopted by the House of Representatives at the last session of Congress.

With a view to procure such information as will enable me to prepare the report called for by the House of Representatives, I have propounded to several officers of the engineer corps certain questions, to which they are desired to give their separate answers.

I desire also to obtain the opinions of several naval officers, combining professional science with experience and practical skill on several points connected with the proposed inquiry.

You will therefore oblige me by enclosing a copy of the within resolution to such officers as you may select, and requesting their separate opinions, in writing, on the following points, viz:

1. To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?

2. What reliance could be placed on vessels-of-war or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?

3. Is it necessary or expedient to continue the system of fortifications on the shores of the northern lakes?

Very respectfully, your obedient servant,

C. M. CONRAD, *Secretary of War.*

Hon. WILLIAM A. GRAHAM, *Secretary of the Navy.*

No. 1.

Report of Commodore Morris.

WASHINGTON, *July* 12, 1851.

SIR: I have the honor to acknowledge the receipt of a copy of your letter of June 17, 1851, to the Secretary of the Navy, with directions from him to report to you my opinions upon certain points connected with the present system of

fortifications for the defence of the coasts and shores of the United States, as it has been recommended by boards of engineers and others appointed in 1816 and at subsequent dates.

The particular points to which my attention is directed by your letters are:

"1st. To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvements of projectiles, or other changes that have taken place since it was adopted in the year 1816?

"2d. What reliance could be placed on vessels-of-war or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?

"3d. Is it necessary or expedient to continue the system of fortifications on the shores of the lakes?"

1. I have endeavored to ascertain, by an examination of some of the reports from the boards of engineers and other officers upon this subject, what system of defence they recommended, the bases of that system, the objects they proposed to accomplish by it, the particular measures which they suggested to secure those objects, and the data on which they determined the character and force of the respective fortifications which are embraced in their general plan of defence.

2. The *bases* of their system are: a *navy* composed of armed vessels capable of navigating the ocean with safety and of reaching distant points speedily.

Fortifications, permanent and temporary, with the auxiliaries of floating batteries, gunboats, and steam batteries, and both fixed and floating obstructions to channels.

Interior communications by land and water, and a *regular army and well organized militia*, all to be so combined as to form a complete system.

3. The objects of the system were to leave the navy free to protect our own commerce or to act against an enemy on the ocean or upon his unprotected coasts; to close all important harbors against an enemy, and secure them to our military and commercial marine; to deprive an enemy of all strong positions, where, protected by naval superiority, he might maintain himself and keep our frontier in continual alarm; to prevent, as far as practicable, the great avenues of interior navigation from being blockaded at their entrances into the ocean; to cover the coastwise and interior navigation, by closing the harbors and the several inlets from the sea which intersect the lines of communication, and thereby further aid the navy in protecting the navigation of the country; and to protect our great naval establishments.

4. To seecure these important objects with all practicable sound economy, and in a manner which in time of war should require the least necessary interruption to the ordinary pursuits of our citizens, appears to have been the controlling motive in determining the position, character, and extent or force of the respective works which the boards have proposed.

5. Of these works *permanent fortifications* are mainly relied upon, and have preference over any of their auxiliaries wherever due security can be given without the aid of the latter.

6. The dimensions, form, and strength of each fortification appears to have been determined by the local topography, the importance of the interests which it was intended to secure, the character and amount of force by which it might probably be assailed, and the time which would be required to concentrate upon it a sufficient number of militia to secure it from capture by such assailing force.

7. Your first question requires an opinion of the expediency of any modification of the present system of fortifications in consequence of two specified causes, and of "any other changes that have taken place since it was adopted." It becomes necessary, therefore, to ascertain what "other changes" have thus occurred, and which would probably have led the boards of engineers to different recommendations, if the present state of things had existed when the plans were proposed.

8. Among these causes and changes the most important appear to be the dis-

covery of a channel leading from the ocean into the bay of New York, which could not be commanded by any of the fortifications proposed by the board; the application of steam power to armed and other vessels for ocean navigation; the great increase in the number and the size of the mercantile and packet steamers which are employed on our interior lakes, bays, and rivers, and the substitution of shells for solid shot to be fired from cannon; the introduction of the electric telegraph for communicating intelligence, and of railroads for the transportation of persons and materials; and a greatly increased and more dense population in the vicinity of many of the points which were intended to be protected against an enemy.

9. The operations of vessels which depend on the wind alone must always be uncertain, and the best devised plans will be greatly exposed to failure in execution by them. When used as an assailing force against batteries or other fixed objects, the winds which are necessary to carry them to their desired positions might frequently prevent the possibility of their retreat, if it should be desired. The present defences were calculated to resist a force of this character, or which depended on such vessels for its transportation.

Ships-of-the-line and armed vessels of smaller sizes are now moved by steam, either as the only motive power or as auxiliary to sails.

These vessels, under ordinary circumstances and for special purposes, may have their movements regulated and combined, at the will of their commander, with almost the same precision and certainty as can be accomplished by troops on land.

The capacity and armament of many of these vessels, connected with their light draught of water, enable them to operate with comparative ease and safety through channels and upon positions which would be almost secure against attacks by common sailing vessels.

10. When the present system was proposed, the use of explosive shells was only contemplated from mortars, either for attack or defence.

Arrangements are now made for the general use of such shells from large cannon, thus combining the superior accuracy of shot firing with the destructive effects of explosive shells—a change which greatly increases the dangers of a floating force when opposed to permanent fortifications of earth and masonry.

11. In determining upon the character and extent of many of the fortifications which were proposed by the boards an important element of their calculations was the facility or difficulty of concentrating troops upon the work in case assistance should be required to repel an attack by an enemy. This element of calculation has been greatly changed since by the increased density and amount of available population, and at many points by the greatly increased facilities for communicating intelligence by telegraphs and railroads, and for receiving reinforcements of men and supplies by railroads and steamers.

The purchase of Florida since the fortifications and defences for the Gulf of Mexico were proposed has given to us new and important positions for strengthening our defences on that frontier, and for giving greater security to the immense interests connected with the valley of the Mississippi. Our more recent acquisitions, which have given us an extensive ocean frontier on the Pacific ocean, have brought with them new interests, which require fortifications or other adequate means for their protection and security.

12. The increased power which has been given to vessels when moved by steam to regulate and secure their joint or separate action as may be desired, and to reach with comparative ease and safety places which might be considered as nearly secure against ordinary sailing vessels; the additional power which is given to fortifications when acting against ships or other floating force by the substitution of explosive shells for solid shot; the discovery of new channels to and from some of our harbors; the facilities for more rapid concentration of troops and supplies than was formerly practicable, and the acquisition

of large extents of new territory, are changes or causes which, in my opinion, may render some "modifications" of the details of the present system more advantageous. At least these changes appear to be of sufficient importance to justify, if not to require, preparatory to definitive action, a re-examination of the present system, as recommended by former boards, with the same thorough and careful deliberation which was bestowed when it was originally proposed.

13. In reply to your second question, "What reliance could be placed on vessels-of-war or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?" I respectfully state that, in my opinion, no *safe* reliance could be placed on any of the kinds of force enumerated in your question, as "substitutes" for permanent fortifications, unless they should be multiplied to an extent that would require an expenditure which would be unreasonably great, and much greater than would give equal security by a judicious combination of permanent fortifications and a floating force as auxiliary to them. On any sudden emergency, private steamers and other merchant vessels might be usefully employed in aid of other means which had been previously prepared, either by having them armed to contend with an enemy, or to bring forward reinforcements of men, materials, or other supplies. Little advantage could be expected, however, from the vessels for direct assistance, unless all that was necessary for their armanent and equipment had been previously prepared, and kept ready for immediate use.

14. The voluntary use of vessels-of-war, which are able to navigate the ocean, as substitutes for fixed fortifications, or even as direct auxiliaries to them, except in extreme cases, would, in my opinion, be highly injudicious. The proper employment of such vessels-of-war or of our navy is to afford all possible protection to our merchant shipping, to destroy or harass an enemy's commerce, and either by itself or in conjunction with troops to assail an enemy's possessions at points where they would otherwise be inaccessible to us.

15. The protection which the coasts of our country may justly expect from the navy is that which it may afford by intercepting forces which may threaten attacks upon it; or when unequal to that task, diminishing the means of an enemy for such attempts, by rendering it necessary for him to protect his own commerce or his own shores against our ships-of-war.

16. With a navy sufficiently powerful to compete fairly with that of an enemy, great additional security would be given to our coasts by it, and still greater if our naval force was decidedly superior. But even under these favorable circumstances the chances for avoiding the most vigilant watchfulness on the ocean are so great, that so long as we expect wars with nations having a respectable navy, sound policy and true economy, in my opinion, requires permanent fortifications at all points necessary to defend our important national establishments, our populous and wealthy cities, against sudden attacks, and to keep open, as far as practicable, our coastwise navigation and other communications, which might otherwise be interrupted by any enemy who could elude the vigilance of our navy. The navy, if employed as here suggested, would not render it as substitute for fortifications, but would give an increased security to our seaboard, and in proportion to its strength diminish the necessity of interrupting the ordinary pursuits of our population.

17. To the third question, "Is it necessary or expedient to continue the system of fortification on the shores of the lakes?" I state as my opinion that no future attacks from the Canada shores of the lakes, of a character sufficiently powerful to affect the final result of war, are to be apprehended; still, the advantages which are offered by the St. Lawrence and Rideau canals for the increase of a naval force on Lake Ontario might give to Great Britain a temporary superiority of naval force on that lake. This superiority, and the presence of a considerable body of regular troops which are always kept in Canada, might induce and possibly enable an enemy in Canada, by a sudden incursion,

to injure our great lines of communication by railroads and canals, on the lake frontier, or to levy contributions on cities near it, all of which would be greatly exposed if there were no fortifications to furnish military supplies for the surrounding militia, and so aid them in repelling such attacks.

18. Under existing circumstances it would, in my opinion, be expedient to continue the present system so far as to retain all the fortifications on the lake frontier which have been completed, and to complete such as have been commenced. The expense would be comparatively inconsiderable, and would no doubt be amply repaid by the increased security and other advantages which would be gained at the commencement of any war in which Canada would have the character of an enemy to us.

It has been difficult for me to confine my remarks very strictly to the precise questions which were submitted, but it was believed that the reference to "other changes" in the first question would be a sufficient excuse for the latitude which has been taken.

With much respect, your obedient servant,

C. MORRIS,
Captain U. S. Navy.

Hon. C. M. CONRAD,
Secretary of War.

No. 2.

Report of Commodore C. M. Perry.

NORTH TARRYTOWN, *July* 25, 1852.

SIR: In obedience to your order of the 23d ultimo, covering a copy of a communication of the Secretary of War, together with a copy of a resolution of Congress, calling for information upon the expediency of modifying the system of national fortifications established in 1816, I have the honor to report—

In reply to the first inquiry, as follows:

"To what extent, if to any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the inventions or improvement of projectiles, or other changes that have taken place since it was adopted in 1816?"

I may remark that, in my opinion, it is desirable that the system referred to should be substantially modified by an entire abandonment of the plan of *exterior* coast fortifications, and a confinement to the completion of the works already commenced for the protection of our principal ports of trade and naval depots; and that no greater number of works should be recognized as permanent means of defence of the more important points upon the seaboard than those that may be suitably garrisoned and kept in constant preparation, whether in peace or war, for repelling an enemy.

In the attempt to sustain the position which I propose to assume, being at my residence in the country, without proper documents or other data to enable me to enter fully into detail, I shall, with but two exceptions, refrain from alluding to the published statements and reports of others upon the subject; and while cheerfully according to those who may differ from me all credit for sincerity and patriotism, I may content myself with a general expression of opinion upon the question under investigation, calling particular attention to the report of Mr. Cass, when Secretary of War.—(See Doc. 293, 24th Congress, April 8, 1836.)

Concurring, as I most fully did at the period of its date, (1836,) and as I do now, in the opinion set forth in that masterly state paper, I might be satisfied in assuming the whole range of argument of that distinguished man, as exhibiting

my own views upon the great question of national defence, had not the imagination even of his prophetic foresight been outstripped by the extraordinary developments of the few subsequent years—developments which, though they have thrown into bolder relief the more prominent features of his prophecies, have gone far beyond the anticipations of the wildest visionary, bringing to light improvements in practical science utterly astounding to the theorists of yesterday, deranging all previous plans of war, whether by sea or land, and foreshadowing even further changes, perhaps equally remarkable; and thus showing that if the system, under things as they existed in 1816, was wisely devised, (a proposition I have never assented to,) there is no longer the remotest useful object to be gained by persistence in the plan, but rather on the contrary. The erection of isolated exterior works upon our seaboard would, instead of contributing to our protection, hold out assailable points, inviting attention from an active enemy, in the possibility of carrying them by *coup de main*—an achievement not so difficult since the use of steam for naval purposes; and when, moreover, it may be fairly presumed that these works, however extensive and complete in themselves, would in fact be *weak* as defences, for want of adequate garrisons; that is, if we are to judge from past experience and the present desolate condition of some of those already constructed, made necessary, it is true, for want of troops to send to them.

Let us suppose, for purpose of illustration, that the two works recommended in the original design to be erected on Sandy Hook bar,* (see report of War Department, House Doc. 206, 26th Congress, 1st session,) are completed, and garrisoned by the estimated number of rank and file assigned to them, say 1,760 each, their isolated position would place them beyond the effective range of guns planted upon Sandy Hook, the nearest land; and being encircled by channels navigable for the largest war steamers, they could not prevent the ingress of the enemy, and unaided by a friendly naval force might be surrounded by the hostile ships, who, if they did not surprise and carry them by escalade, would have the power to cut off their communication with the land, and consequently their supplies.

And let us suppose further, that in conjunctures like those growing out of the northeastern boundary and Oregon questions, where serious difficulties with Great Britain were anticipated by many, (and everybody knows that a similar contingency did happen under the administration of General Jackson, with France, and may again happen,) that these forts were completed, and armed, and garrisoned, as they probably would be in time of peace, with a single company or half company each, and it might be the policy of the enemy to enter suddenly into war, and give us the first intimation of hostilities by the appearance off the port of a powerful squadron of war steamers, not only would the forts on the bars, inviting attack by their very weakness, be at the mercy of the enemy, but the safety of the city itself would be compromised. For though by a delay of a day or two the inner line of forts could be garrisoned by militia and volunteers, and temporary steam batteries prepared in aid of the outer defences, if the opposing squadron were to be commanded by a *Nelson* or a *Suffren*, such precaution would be too late.

From any of the inner forts, should they perchance make a lodgement, the enemy could soon be driven; but once in possession of the outer line of works, with the sea open to them, the port would be entirely locked up; hence, in the possibility of such an issue, is it not far better that they should *not* be erected?

But many other solid reasons may be adduced to prove the impolicy of their erection. The impracticability of covering the whole extent of coast by for-

* I shall apply my remarks upon the seaboard defences more particularly to the port of New York, though they are intended to have a general bearing upon the whole coast.

tresses, commanding every port, bay, and roadstead; the improbability of any future attempt by an enemy to land an armed force upon our shores, except for some marauding purposes; and the perfect capability of the inner line of works, assisted by floating batteries to repel whatever force might venture an attack upon any of our principal cities or towns, except by *coup de main*, in which event, as I have before remarked, the outer line of works would prove of immeasurable injury, if captured, as some of them might possibly be by a dashing enemy.*

And, besides, we have the experience of history to show that extensive military works are alike destructive of the prosperity and the liberties of the people, saying nothing of the enormous cost of construction and the keeping them in condition for service. I may instance the fortresses of Spain, of Portugal, and of the former republics of Genoa and Venice, as gigantic works, now of little use, and looked upon by the voyager only as monuments of the extravagance and peculating spirit which, at the time of their erection, characterized the people of those governments.

Experience moreover shows that while the fortifications of San Juan de Ulloa at Vera Cruz, the Moro of Havana, the castle protecting the harbor of Carthagena upon the coast of Columbia, the Venetian fortress of Napoli de Romania, in Greece, the castle of St. Elino, in Malta,† and many others of similar extent and character, are considered by some impregnable. They command only a circuit embraced within the range of their guns, and cannot in any manner prevent a landing of the enemy upon the coast beyond the extent of such range; in a word, these works are useful only to command the entrances of the ports which they were intended to defend, and to cover with their guns vessels anchoring in their immediate vicinity. The celebrated fortress of Gibraltar neither commands the passage of the straits nor the anchorage on the Spanish side of the bay of that name. They are, in truth, like chained monsters, harmless beyond the reach of their manacles; not so with their steam batteries—*they* have the means of locomotion, and *their* power can be made effective at any point upon the coast capable of being reached by an enemy's vessel.

Of all the coasts of Europe that of Great Britain is the least provided with fortifications, and yet her soil has not been trodden by a successful enemy since the conquest—solely protecting her military and naval arsenals by perfect and *well garrisoned* works. She depends mainly for defence of her coast upon her navy and the warlike spirit of her yeomanry; and the very absence of fortified works prevents a deceitful reliance upon such defences, and keeps alive the more gallant and more certain dependence upon their own personal prowess.

And thus it should be with us, man to man. The Americans are, at least, equal to any other race, and they are fully capable of driving back to their ships or capturing any number of troops that might have the temerity to land upon our soil.

Let us suppose that New York is menaced with an attack by a force much

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* In speaking of militia and volunteers above I may add, by way of note, that the city of New York could alone parade, in six hours, one thousand, and in twelve hours, five thousand uniformed troops, composed of men in the prime of life, who would, doubtless, do good service before the enemy.

This body of troops is well officered and under excellent organization, and embraces fair proportions of cavalry, artillery, and infantry, with all the requisite materiel and munitions.

The cities and towns in the immediate neighborhood could furnish an equal number with the same expedition, and there can be little doubt that with the facilities of transportation by railroad and other modes, a force sufficient for all purposes of defence could be concentrated in a very short space of time at any point upon our coast north and east of Texas.

† I more particularly name these, among many others, for reason of being better acquainted with them by personal examination.

larger than the English have ever yet been able to concentrate upon our coast. The only assailable point which might promise any chance of success would be debarkation upon the south side of Long Island and to advance upon the rear of Brooklyn.

This mode of attack was contemplated during the war of 1812–'13, and extensive entrenchments were thrown up by the citizens upon a chain of hills just beyond the town designed to hold the enemy in check until re-enforcements could arrive from a distance;* but the rapid increase of the place has now brought these military sites within the corporate limits of the city, and it will be necessary, in the event of another war, to select more advanced positions on which to construct redoubts to command the approaches referred to, and it would be at this day a measure of wisdom for the government to take steps for selecting and securing the fee of suitable points for military purposes. These positions, judiciously chosen, would, at the moment of alarm, be occupied by myriads of militia and volunteers, who, judging from what was accomplished on a former occasion, would, in an incredibly short time, throw up and man the necessary works; with these precautionary measures, and with a respectable number of steam batteries as auxiliaries to the permanent works *already constructed*, New York would be safe from any *foreknown* attack of the enemy.

With respect to the second inquiry—

"What reliance could be placed on vessels of war or of commerce, floating batteries, gunboats, or other temporary substitutes for permanent defences?"

I reply that much reliance could be placed on all vessels-of-war, particularly those moved by steam, whether intended for ocean or harbor service, as auxiliaries to the fortifications, thereby lessening the necessary number and extent of those permanent works; but there could be no dependence on gunboats or vessels of commerce, except for the temporary conversion of the latter into public armed ships.

But the most reliable force for harbor defence as auxiliary to the fortifications would be steamers of war, in addition to which temporary steam batteries might be equipped at most of our principal ports.

It may be presumed that there is at this time but one opinion among naval men as to the utility of steamers-of-war. The strongest and most unreasonable prejudices growing out of professional predilections must now give way to the unmistakable evidences of their usefulness, and the absolute necessity of their employment at the present day in all naval operations.

These vessels should all be capable of traversing the ocean, and while efficient for ocean navigation, not the less effective for harbor or coast defence.

Steam batteries, so called in contradistinction to steamers-of-war, should be of a temporary character, and used only for the defence of ports, or bays, or roadsteads, and of these there would be no necessity of having many in commission, excepting at times when the enemy might be expected, as they could be prepared in a very short time—the cities and towns which they may be wanted to defend all furnishing the means of their equipment and the requisite crews.

In a communication accompanied by drawings submitted to the Navy Department some years ago, I demonstrated the practicability of equipping and manning at the port of New York powerful and efficient floating batteries in less than three days.

Wherever steam vessels can be found to furnish the moving power and small coasters to be used for floating the guns, as both can be found as well as guns at most of our largest ports, temporary batteries capable of attacking the largest sail ship can be speedily equipped, care being taken to protect, by a mode pointed out, the machinery and the entire hull of the steamer which, without being

* These works covered the rear of the navy yard, Brooklyn.

herself armed; is to furnish the power of moving the batteries from one point to another.

Modern discoveries in the use of warlike projectiles have shown, and especially in the use of explosive shells, that wooden bulwarks, however massive they may be, so far from giving protection to those behind them, cause by their splinters greater havoc; hence the inutility of such defences in the proposed floating batteries, which, by means of the steam power attached to them, may be easily kept at long range with the enemy and beyond grape or canister distance.

But no one can foretell or scarcely imagine the changes in the art of war that steam and other natural elements more recently brought into use are to produce.

On a late occasion I had the honor of suggesting to the Navy Department a new mode of attack by steamers-of-war. The opinions then advanced have been more and more confirmed by further reflection and consultation with intelligent engineers and ship-builders, and I am now well satisfied that, besides the use of an ordinary war steamer, as a striking body, in the manner explained in the communication referred to, a steam vessel, to be moved by a submerged propeller and capable of traversing any of our inland waters, may be constructed and advantageously used solely as a *projectile* (using the term in this sense.) This vessel should be long and narrow, and of unusual proportional depth to accommodate the engines and boilers, and the crew, (if desirable,) below the water line. She should be of wedge-shape forward, with the most approved lines for speed, considering her depth and her whole construction, whether built of wood or iron, of sufficient strength to give the requisite momentum, and the power to withstand the most violent shocks produced by collision with other bodies.

A vessel of this description, say of two thousand tons measurement, would weigh, with her machinery, &c., nearly four thousand tons, and might be propelled with engines of extra proportional power at the rate of fourteen statute miles per hour. We have thus a projectile (still using the term) of this weight moved upon the surface of the water at the velocity of twenty feet per second. Can any one imagine the overwhelming effect of a contact of this moving body with anything capable of floating upon the ocean? This is no visionary project, but one of simple demonstration and practicable accomplishment.

In reply to the *third* inquiry, as follows: "Is it necessary or expedient to continue the system of fortifications on the shores of the northern lakes?" I answer in the negative, and for the very obvious reason that we have now the command of the lakes so far as regards an aggregate superiority of tonnage and seamen, and it would be strange indeed if, with the well-organized militia of the States bordering on and contiguous to these waters, and the facilities for transportation to the scene of war of any number of regulars and volunteers with the requisite munitions, we did not, at the least, preserve the integrity of the soil, and the navy would be recreant to its former reputation did it not sweep from these inland seas every vestige of an opposing force.

In reference, therefore, to the foregoing remarks, I respectfully submit—

That no additional fortification be commenced on the Atlantic seaboard, leaving it questionable whether those already commenced should be completed *to the extent originally designed.*

That very great reliance can be placed upon steamers-of-war and steam batteries as auxiliaries to the military work now completed or in progress of completion.

And lastly, it is altogether unnecessary and inexpedient even to progress any further with the uncompleted works which have been commenced on the shores of the northern lakes.

For myself, I cannot entertain the idea that we are always to act on the defensive; on the contrary, it is more reasonable to suppose that, in the event of

another war, the power of the United States will be felt beyond their own immediate coasts; most certainly it ought to be, for we have the means of placing ourselves upon an equality of naval strength with any of the European nations.

Looking to the inexhaustible resources of the country, the warlike and adventurous spirit of the people, its extensive and rapidly increasing commerce, and the acknowledged superiority of the Americans in the construction and management of ships, whether navigated by sails or steam—is it not surprising that all our military plans have hitherto been confined to the mere defence of our firesides against an enemy, always supposed to be able, in order to reach us, to cross with a superior force *intact* a wide expanse of ocean, and knocking at our doors, to cause the whole country to be thrown into alarm?

Why should we barricade ourselves and wait within our defences the coming of the enemy? Why not do that which is more congenial to our national spirit—meet them beyond the threshold, and thus preserve our waters and our soil inviolate? We possess the power; why not exercise it? In truth, the destinies of the nation are inevitably leading to events which will sooner or later make us superior on the ocean, and instead of tamely waiting the approach of the foe, we shall be more apt to turn the tide of war eastward.

The great battles for national mastery are to be fought upon the ocean, and the sooner we prepare for the struggle the better.

Hence it is evident that upon the navy the country should chiefly depend for its protection from invasion, not under its present organization, but upon a navy commensurate in extent to the commercial resources and wealth of the nation; we should have naval strength sufficient to protect our commerce in every sea, and in time of war to assume the offensive.

Still it would be unwise to neglect a reasonable system of permanent defences upon the coast, but not by any means to the extent contemplated by the system of 1816.

In the opinions which I have ventured to advance upon the fortifications of the country I have intended to allude only to the Atlantic seaboard and the shores of the northern lakes. Believing that the seaboard on the Pacific ocean is infinitely more exposed to successful attack from either of the great naval powers of Europe—England, France, and Russia, and may require additional defences; but not being well acquainted with that coast, I abstain from any remarks upon the subject. In connexion with this report, however, I propose to submit, at a future time, some remarks upon the importance of securing the naval command of the Gulf of Mexico, with special reference to the better protection of our Pacific possessions.

With great respect, I have the honor to be your most obedient servant,

M. C. PERRY.

No. 3.

Report of Commander R. B. Cunningham.

UNITED STATES NAVY YARD,
Gosport, Virginia, September 29, 1851.

SIR: In pursuance of an order from the honorable Secretary of the Navy, dated June 23, 1851, enclosing a copy of a letter from you to him, with a copy of certain resolutions of the House of Representatives of the last session of Congress, pertaining to a proposed modification of our system of defences by means of fortifications on shore; and directing that I should give to the subject

my best reflections, and communicate the result in season to be reviewed by you prior to your report in obedience to resolutions aforesaid in December next.

With a diffidence I have never before experienced in drawing up an official communication, I will endeavor to give you my views on this important question of national policy with as much brevity as its magnitude will admit of; but I beg leave to state that, while I feel myself highly honored by the consideration so undeservedly bestowed upon me by the honorable Secretary of the Navy in selecting me for a duty of so much consequence, and which calls for scientific attainments in its execution that I do not aspire to, I must claim your indulgence when, in all sincerity, I state to you that my remarks are drawn from my very limited practical observation and experience only.

To the first inquiry, viz: "To what extent, if to any, ought the present system of fortifications for the protection of our seaboard to be modified in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?"

I would respectfully reply that the important improvements in the application of steam to ships-of-war and sea-going ships, and the certainty that railroads will be continuous in a few years from Maine to Texas, and that by these facilities, troops, munitions of war, and stores of all kinds can be transported with such expedition that in a very short space of time large bodies of men, with the necessary artillery, can be concentrated upon any intermediate point between permanent fortifications fully prepared to meet an invading foe before an invader could make any material progress in the erection of fortifications for his defence, should, in my opinion, induce the government to direct its attention alone to those points in our seaboard where the protection of our cities and such roadsteads as are calculated for naval depots, and where large fleets can rendezvous, be sheltered, and ride in safety at their anchors at all seasons of the year.

It can hardly be supposed that any nation would be so reckless as to attempt an invasion of our Atlantic coast at the present day; but a large and powerful fleet could approach within gun-shot and batter down our cities if they were not prepared with fortifications in all respects adequate for their protection and defence.

These fortifications should be so located as to command the channel way; and at the inner extremity of every reach there should be a battery erected, if practicable, so as to commence a raking fire upon an enemy the moment he approached within the range of its guns.

The guns for the batteries should be of the largest calibre and of the greatest range, as the effect of the shot would be more destructive and the enemy sooner reached.

There has been no improvement in projectiles; nor can the application of steam to ships-of-war do away the necessity of building permanent fortifications at the points before enumerated; but, as a modification, I would repectfully suggest that steam propellers of sufficient power to attain a speed of ten or twelve miles per hour be constructed as auxiliaries to the permanent fortifications, and for the additional protection and security of our cities and harbors.

These steamers should be of peculiar construction and equipment, and one or more, as may be deemed expedient, should be stationed at each of the permanent fortifications.

Ships are at all times liable to accidents from various causes; and more especially so are steamers, as they are subject to the same injuries that other vessels are from storms and other disasters of the sea, with the additional ones of fire, explosion, &c.; and when in commission their expenses are fourfold greater than sailing ships. I propose, therefore, that machinery for as many of those ships as may be deemed expedient be constructed, put together, *tried*, and

then taken apart, and when carefully packed, stowed in suitable storehouses and kept ready for use; and that the materials for the hulls of these steamers be procured, and the timber properly stowed in well ventilated sheds

The steamers should be built of *logs*, their length not less than two hundred and fifty feet, with sufficient breadth to admit of batteries across at each end of six ten-inch guns, and three mortar beds between the batteries. Their bottoms should not be perfectly flat, but formed with a slight ellipse, the bilge rounded, and their extremities handsomeiy tapered, so as to enable them to pass easily through the water.

These steamers are intended to be shot-proof, as it is designed to have iron plates one inch and a half thick and six inches wide let into their sides from stem to stern, and about two and a half inches apart, this to be extended from gunwale to two feet below deep load line; and when it is remembered that they are to fight end on, and built of long easy lines from stem to stern, the conclusion is irresistible that a shot touching those plates will most assuredly glance off.

In all works intended for public defence, as a system, two strong points should always be borne in mind, viz: simplicity and economy; and as these vessels are to be of the simplest mode of structure, and built of the cheapest material, while at the same time it is as durable as any other, (white pine,) and the construction of them so simple, that carpenters, joiners, and, in fact, all who can use the broad-axe and adze, can be profitably employed in their construction when they are needed.

Another peculiarity in these vessels is to have their sterns perpendicular, of great thickness, and an iron cut-water firmly attached thereto, and in a width of two and a half feet, bearded off to half its thickness at the stern, so that when in action, and the enemy at hand with his broadside presented, the steamer, with her greatest momentum, is to drive directly into him; and it cannot be doubted that this operation once performed would require no repetition, as nothing heretofore built in the shape of a ship could withstand the concussion.

The mortar beds are intended to be used in the event of an enemy's obtaining a landing at a point where he could be sheltered from the operation of battery guns, but accessible to shells from mortars; and as these steamers will be of light draught of water, they will be enabled to approach the shore much nearer than other vessels of equal size if differently constructed.

It has long been my opinion that steamers are more to be feared from the power they possess of running into an enemy than from any other cause, either from their great weight of metal and consequent extended range, the choice which they are enabled to make of position, or any other superiority claimed for them, for in all these respects ships-of-war can be built to equal them; but if constructed as here described, and properly managed, they are not to be resisted.

With one more remark I will close my response to the first branch of your inquiry.

The telegraph, in the event of war, will keep them constantly informed at headquarters of the movements of our enemy's fleet on our Atlantic coast, and the old ruse of making a demonstration at one point for the purpose of effecting a landing at another, can no longer be practiced with the usual success, as their movements will be anticipated, and the necessary preparations made to receive them. This great invention offers an additional argument for the discontinuance of intermediate fortifications.

In reference to our possessions on the Pacific, a little deviation from the course recommended to be observed on this side would be advisable. There it will be necessary to construct the permanent fortifications, so as to enable them to stand a siege, as invasion in that remote quarter is probable, in the event of war with a strong maritime power; but in all other respects the course to be pursued

should be the same as on this side, as it is to be presumed that the telegraph will soon be extended there, and in the course of time railroads also.

To the second, viz: "What reliance could be placed on vessels-of-war, or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?"

The indispensable, and, in fact, imperative necessity of having *strong* permanent fortifications at the points before referred to, is a settled and decided conviction of my mind; they will admit of no substitute.

Steam batteries, such as have been recommended in my reply to your first interrogatory as a modification, would unquestionably prove an important and powerful auxiliary, and in all probability would, in the day of battle, if properly managed, be the more destructive of the two; but, like all ships, the materials of which they must necessarily be constructed are perishable; and possibly, at the moment their services are most required, a broken shaft, or some other of the numerous accidents to which all such ships are liable, would render them unavailable, if not altogether useless; and hence the risk a nation would encounter in adopting any substitute for permanent fortifications when there existed a possibility of its failure.

Third. "Is it necessary or expedient to continue the system of fortifications on the shores of the northern lakes?"

To this, your last inquiry, I would state, that the unprecedented change which the entire shores of our northern lakes has undergone since the termination of the late war with Great Britain renders it very improbable that invasion will ever take place from the opposite shore. Certain destruction would await an enemy who attempted it. Then the population was comparatively sparse; now cities and villages are to be seen in every direction, occupying places which were then an uninterrupted wilderness, and hosts of stout hearts ready to do battle, if needed; besides the numerous and increasing facilities for building ships and for transporting munitions of war forbid the idea that the northern lakes will ever again constitute an arena for naval combats.

In the event of another war with Great Britain we would be able to build and equip five ships to her one; this fact alone affords a conclusive reason why the government should run to no unnecessary expense in its preparations for war in that quarter.

Our tonnage will, as it is now, always be greater in the lakes than that of Great Britain, which must secure to us the supremacy in the event of war, as many of those vessels, steamers and others, could be converted into cruisers, which would not only protect our shores from invasion, but push the war into the enemy's country.

Ports selected for naval depots should have heavy guns ready for their protection; and parks of artillery, composed of heavy ordnance, should be kept in readiness at the different military posts for immediate use or transportation. Further than this, I think the government is not called upon to provide for defence.

In conclusion, I beg leave to state that if there should be another war with one of the strong maritime nations of Europe, the trial of strength *must be upon the ocean*, and it behooves the United States to be well upon their guard. As to the opinion which is rife among us, that steam alone can constitute an efficient navy, and that the nation who can command the greatest number of steamers is to hold supremacy on the ocean, I regard as one of those visionary speculations based entirely upon the opinions of mere theorists. Their efficiency for towing ships into position, and for transporting munitions of war, I admit.

If we had ten ships of two hundred and forty feet in length, with a proportionable breadth of beam, and built to carry their metal upon two decks, instead of four, and their batteries throughout to be of ten-inch guns, I believe it would take the combined steam navy of Great Britain to cope with them.

Two years' war, with a large steam navy to support and keep in constant

service, would bring any power in Europe to bankruptcy; and I trust our government will not be drawn into so unwise and expensive a system of national defence.

I have the honor to be, with great respect, your obedient servant,

R. B. CUNNINGHAM,
Commander U. S. Navy.

Hon. C. M. CONRAD,
Secretary of War, Washington.

No. 4.

Report of Commander S. F. Dupont.

Report on the national defence, in reply to the following questions, submitted by the Department of War.

First. "To what extent, if any, ought the present system of fortifications, for the protection of our seaboard, to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?"

Second. "What reliance could be placed in vessels-of-war, or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?"

Third. "Is it necessary or expedient to continue the system of fortifications on the shores of northern lakes?"

Whether treated distinctively or generally, these inquiries may be supposed to amount to this: Shall we expend as much as we have hitherto done for defence upon fortifications? and how have these been affected by the introduction of some new elements in war, such as steam power, and enormous projectiles of an explosive character?

This subject is one which involves the honor and safety of the country; it has been critically examined by distinguished military men and eminent statesmen, and I do not venture to think that I can throw much new light upon it. In such an investigation one's profession and *esprit du corps* would naturally lead in any scheme, for the general defence, to bring the navy prominently forward. But this question is too broad and national to be viewed from any such narrow limits, and in examining it an officer should discard from his mind to which arm of the public service he belongs. In my apprehension, however, the most extended system of fortifications for the defence of our seaboard will still leave enough for the navy to do; a navy, too, carried far beyond its present number and strength. Indeed, this arm can only fill its special mission in war, that of *aggression*, by being enabled to leave the great seaports and exposed points of our maritime frontier to a more certain and more economical system of protection, in order to carry the "sword of the state" upon the broad ocean, sweep from it the enemy's commerce, capture or scatter the vessels-of-war protecting it; cover and convoy our own to its destined havens, and be ready to meet hostile fleets; in other words, to contend for the mastery of the seas where alone it can be obtained, on the sea itself.

Yet it is not to be denied that theories have sprung up, assigning much less importance than formerly to fortifications, in a system of national defence, under the influence of opinions which doubtless have some truth in them, but which are liable to be carried to a dangerous extent. Various reasons might be assigned for this change of opinion—speculation, supposed economy, a mistaken desire to

advance the interests of the navy, in short, the characteristic pursuit of theories into the field of extravagance.

But it may be still more probable that these views mainly spring from some misconception as to the extent proposed for a system of permanent defences. Some would seem to believe that our seaboard and lake frontier were to be bound by a Chinese wall, and that all the salient points on the coasts were to be crowned by castles, the cross-fires of which would cover the intervening space; in other words, that the system of fortifications proposed to protect some four thousand miles of sea-coast from the possibility of invasion or attack. But is there any cause to apprehend such extreme views? And if they should exist, is that a sufficient reason for rejecting a wise and practical system of permanent defences vitally essential to the safety of important points, and so clearly within the means of the country to provide?

In treating this branch of the subject, can we do better than examine the objections presented and the modification proposed, from sources entitled to the gravest consideration?

Holding the first position among these is the report of a distinguished statesman, then occupying the Department of War, and still holding a prominent place in the public councils—a gentleman, too, familiar with arms in early life, and one of the defenders of his country in the war of 1812. His views, set forth with great ability, received the indorsement of another distinguished personage, President Jackson, and were submitted to the national legislature in the year 1836.—(Doc. No. 243, 24th Congress, Gen. Cass's report.)

Now, it is submitted that there has been an equal misconception as to the scope and tendency of this able report, as with the views considered extreme, on the other side. In the one, modifications recommended in reference to special features have been considered as objections to the whole system; in the other, an extended scale of defence, because we had an extended frontier, was looked upon as a desire to cover the whole surface of the land with forts and field works, and to rely upon these alone for defence. Whereas the only difference related to the character and extent of the works to be constructed, based upon the consideration that there was scarcely a possibility of these works being called upon to repel attacks by *land*, as well as by water, and repeating the hypothesis that an enemy will ever attempt to make a more or less permanent establishment in the country. Such an establishment as would induce him to make a formal investment of some of these first class works, requiring a large army with its battering trains and other preparations for siege. Views on these points are presented in full, and with great force, yet the objections are strictly confined to what is conceived to be the unnecessary magnitude of some of these works, but not to the system of permanent defences, for the distinguished author of the report tells us with equal explicitness:

"I consider the duty of the government to afford adequate protection of the sea-coast a subject of paramount obligation, and I believe we are called upon by every consideration of policy to push the necessary arrangements as rapidly as the circumstances of the country and the proper execution of the works will allow. I think every town large enough to tempt the cupidity of an enemy should be defended by works, fixed or floating, suited to its local position, and sufficiently extensive to resist such attempts as would probably be made against it. There will, of course, after laying down such a general rule, be much latitude of discretion as to its application. Upon this branch of the subject I would give to the opinion of the engineer officers almost controling weight, after proper limitations are established." * * * * * * * *

"All the defences should be projected upon a scale proportionate to the importance of the place, and should be calculated to resist *any naval attack* and any sudden assault that a body of land troops might make upon it." * *

"It is to be observed that the great object of our fortifications is to exclude a naval force from our harbors; this end they ought fully to answer."

In truth, it cannot be questioned that our principal seaports, naval depots, and all important points on our seaboard, should receive commensurate protection; neither should there be, in our judgment, a question as to the mode in which this protection should be given. It would seem unnecessary to set forth the advantages for such purposes of fixed defences or fortifications. These advantages have been shown over and over again by our distinguished engineers, and never controverted. To run over some of these once more, it may be said of forts that they are the only permanent defences, and the most economical, for, with the present science in construction and choice of material, the outlay is there once for all, for the repairs are next to nothing. Forts offer means by which a small force is enabled to resist a large one; a small number of men a large army. In the event of an attack by a competent power upon a place liable to be put under contribution, the injury might be accomplished before sufficient means of resistance could be assembled. Forts can be made impregnable against any naval force that could be brought against them, and are needed for the protection of our own fleets while preparing for hostilities on the ocean. They are secure depots for munitions of war, and render defence certain and easy, and above all, a defence which rarely involves loss of life, leaving the ordinary state of society undisturbed. No alarms are created; no calling of men from their ordinary business. In short, by rendering success impossible, they derive immunity from attack.

It is impossible to view with favor the substitution of floating or steam batteries for permanent defences, the preparation of which will be ever deferred, on account of their perishable nature, until danger is pending; and if ready in time, their value ceases with the occasion which called them forth, for their decay is certain and speedy. Their unsuitableness and want of adaptation to the alterations constantly made in the means and implements of war are also elements of insecurity in these wood and iron defences for harbors. There can never be any certainty that some recent discovery has not lessened our effective force, without any remissness on our part; there can be no certainty that we may not be suddenly called on to renew our expenditures before our last appropriations have been spent. For example, a well-known, and scientific, and practical gentleman obtained the contract, under a law of Congress, to construct for harbor defence an iron floating battery, which was to be shot and shell proof—in fact, invulnerable in every respect. A target, constructed after the manner he proposed for the sides of his battery, was subjected to the test of one of Commodore Stockton's large guns. It presented little or no resistance; the ball passed through without difficulty, tearing out large fragments formed of seven thicknesses of boiler-iron, well bolted and rivetted together. There is no desire, however, to be understood as excluding altogether these costly and unwieldly machines; they may serve as important auxiliaries to forts, in broad sheets of water, or special localities not within the range of the fixed work; though, in all probability, in most cases the hulls of stout merchant ships, strengthened and prepared for mounting one or more pieces of heavy ordnance, would be sooner got ready and answer an equally good purpose. But to leave the whole defence of our harbors to such temporary expedients, built of materials as vulnerable and perishable as ships, would be expending enormous sums in order to invite attack.

Throughout this report I was at first disposed to take for granted that no idea could prevail in this country, to any extent at least, that would desire to retain the *navy proper*—by which is meant efficient steam and sailing ships-of-war—within the harbors, for harbor defence; but it seems to be included in the scope of one of the inquiries, and cannot be overlooked.

What, then, is the first object and main purpose of a navy but the defence

and protection of our commerce? It is the only form in which that protection can be given; but this is essentially taken away when it has assigned to it the defence of our seaports. It may be said that the navy will be increased to such a size as to be able to perform this double duty. There is nothing in our past history to authorize such a belief; and in time of peace the people of the United States will never support such a naval force. They object to spending much money on the *personnel* of military establishments. Nor does it belong to their temper, or their position among nations, to indulge in apprehensions of war: their time is too much occupied with the noble arts and pursuits of peace to feel such an interest in this subject as must be felt to bring them to such large expenditures upon perishable materials.

If our country had to rely upon naval defences, it may well be questioned whether any portion of the navy would be suffered to leave our coasts for the protection and preservation of our foreign commerce, while we were under the alarm of war. However great the naval force might be, it would not be thought sufficient. The dangers nearest home would command our interest and sympathy; the preservation of our great emporiums of commerce from sudden devastation would cause the single trading ships upon the ocean to be forgotten. And how would a naval force, for home defence, be partitioned out to the different cities and stations, without endless vexation, dissatisfaction, and dispute?

To employ our active navy, in whole or in part, to the entire or partial abandonment of our system of fortifications, would be to supplant impregnable bulwarks by pregnable ones—a fixed security by a changeable one—placing perishable materials in lieu of those that are durable; it would be exposing ourselves to the chance of being suddenly left, for a time, without defence, through new discoveries in the art of war; it would be opening the way to expenditures of money which no estimate could count the sums; it would be depriving our commerce of its legitimate protection, and would be resigning our sense of security, peace of mind, and continuance in our pursuits without interruption, in the event of war. But there are objections to such a plan still more fatal: it involves the sacrifice of the lives of our fellow-citizens, and proposes to make their bodies, since they are brave and willing, the walls of defence for the enemy to fire at, instead of stone or mortar; it is compelling the conclusions of science to give way to mere speculations, and rejecting the experience of the world. Nor is this all that is involved in so destructive a proposition: it would divert the navy from its highest duty; deprive it of its chief honor and merit, and best claim to the respect and support of the people, that is, the vindication of the national honor, and the maintenance of the national freedom and independence upon the high seas. Again, if naval defences are relied on, they will either be manned or not. If manned, what shall we say of the effects of such a life upon men and officers?—would it not be destructive of all those characteristics of skill, daring, and endurance which give to the seaman his power and prestige upon the ocean? If not manned, then, compared to forts, they are what wooden docks are to stone docks. In either case, more men will be required to keep them in repair than forts.

On the question of economy, let us further consider the cost that would be entailed upon the nation, by the alarm of an invasion or the appearance of a hostile fleet on the coast.

The sudden equipment and preparation of an army, and its maintainance sufficiently long to remove all apprehension, would cost more, at every principal seaport, on one single occasion, than all the forts. Then what would be the first thing that an army would do, belched forth by the tens of thousands from every railroad station and terminus, but to set to work and throw up the best fortifications they could in the emergency? Would not every musket be grounded: take up picks and shovels? Again: shall we dwell upon the state of the public

mind, in one of our chief cities if its approaches were left without forts, equipped and manned?

Is there any exaggeration in the picture of an enemy's fleet of some thirty steamers watching an opportunity, and through the ever recurring vicissitudes on the ocean, familiar to professional men, eluding a naval force of our own, which it would not have been willing to encounter, running up New York harbor, anchoring from the North to the East river, in a semicircle round the battery, hurling destruction with its new and gigantic projectiles, setting fire to the forests of shipping, and burning the navy yard; and retreating the moment the temporary and hurried defences began to tell against them, destroying more property in a few hours than would cover the shores of Raritan bay, the Narrows, and the islands of the Sound, with fortifications? Now, this is the kind of warfare we must look to, and that we must carry on ourselves.

The greater the injury we can inflict, the more rapidly this injury is repeated, and the sooner we will obtain redress and bring an unnatural condition of affairs to a close. The position of Halifax, Bermuda, and the West Indies, must ever be borne in mind, where fleets may wait for a fitting opportunity for incursions; to suppose that there are to be no such thing as surprises, because railroads have been invented and hollow shot cast, seems to be taking for granted that human life has changed. Indeed, those who indulge in such theoretical securities are preparing for themselves surprises, perilous ones too.

Steam will be the great agent in giving to the new elements of destruction powers of ubiquity. Wherever there is a vulnerable spot, there we must dash, and there an active enemy will dash at us. But it must be remembered that so far as the improvements in projectiles, specially referred to in the inquiries under consideration, are concerned, these have, relatively to ships, *strengthened forts*. Hollow shot crumble into fragments and fall harmless when directed against stone walls. At the siege of Antwerp, under Marshal Girard, they were thrown from heavy mortars without effect, and experiments at home have further established the fact. It takes solid shot to batter walls and make breaches—plenty of them, and rapidly discharged, and concentrated upon or near one spot.

On the other hand, we have only to imagine a few eight and ten-inch shells passing through the side of a line-of-battle ship into the main or lower gun-deck, and there exploding amidst the dense crowd at the batteries, every fragment multiplying itself in countless splinters of wood and iron as destructive as itself, and if it should fail to burst, still doing all the injury a solid shot could do. Or, let one enter on the orlop deck among the passers of powder; or, lower still, striking at the water line, tearing out large irregular fragments, and leaving openings defying all shot-plugs. Change the scene to a steamer, with all the circumstances above mentioned of pervious sides and crowded decks, and conceive a few exploding in the engine room; for truly has it been said that, compared to a sailing ship, a steamer has twenty mortal parts to one! No! when it comes to using hollow shot a ship will prefer engaging something similarly constructed. No ship or ships can lay under a fort at this day; no American fort, at least, with its furnaces for hot shot in addition to these murderous shells.

In this connexion it may be well to make a passing allusion to the past successes of ships-of-war against forts.

They are certainly striking examples of naval prowess, and should always cause a thrill of professional pride in the breast of every seaman, let his flag be what it may; and they should be remembered and studied by officers to incite to deeds of daring, to self reliance, and to faith in that "fortune which favors the brave." But there is no foundation for the theory attempted to be raised upon these successes. The attack on Algiers by Lord Exmouth, commanding

the combined English and Dutch fleets, take it all in all, is probably the greatest naval achievement in this line.

About two hundred guns could be brought to bear against about one thousand in the fleet, and the *fire* of the admiral's ship, the Queen Charlotte, is considered generally by the profession to be equal to any on record; but she was permitted to come in close to the mole, take up her position, swing round her broadside, and make fast to an adjoining vessel, before a shot was fired upon her. This fact alone gives an idea how the defence was conducted; the batteries were defective and unskilfully served, yet the ships hauled off, and the batteries were not silenced, though redress was obtained. Indeed, it is admitted by Lord Exmouth that he could not have continued the contest.

Nearer the present day the capture of Acre is equally celebrated, and is interesting, as the new elements in war, steam power and hollow projectiles, were brought to bear.

The highest military authority in England expressed the opinion in Parliament that this was one of the greatest achievements of modern times; but the same authority added it was also connected with peculiar circumstances which they could not always hope to occur, and warned their lordships that they must not always expect that ships, however well commanded, or however gallant their seamen might be, were capable of commonly engaging successfully with stone walls.

The works in question were in a bad condition and were undergoing repairs. Their position permitted an approach through a channel where only a few guns could be brought to bear against the fleet, most of which took this passage. But few of the guns of the fort were heavy or effective, and only one battery of five guns well served. About five hundred guns were brought to bear on the fort; the walls were not breached, but a large magazine blew up, and, producing a panic, the fort surrendered, which, it must be remembered, was besieged by land also.

We have merely alluded to these two justly celebrated attacks of ships against forts to invite an examination into their details, and into the circumstances of other similar achievements nearly as striking, with the conviction that few persons could be found who would use these instances of success as an argument against the necessity of permanent defences. Surely we cannot measure what has been done in this way, when the preparations for defence and the resistance were conducted by those whose bravery, as in the cases cited, was left unaided by skill or science. Neither let it be supposed, where ships have attacked forts, the results have always been the same; far from it; and it is only necessary to allude to the affairs of Fort Moultrie, and, later, to Mobile Point, Stonington, Fort McHenry, &c., from our own national experience.

Are we entirely to reject, in this question, the experience and practice of the great European powers, England and France? The former, with her gigantic navy, according to the modern hypothesis, would seem to require no permanent defences; nor the latter, with her increasing marine, already brought to a very formidable condition in numbers, materiel, and discipline.

Yet these two nations, while building without ceasing war steamers, are continually adding to the fixed defences of their seaboard, and this, too, with a view of making their navies more efficient in their share of the national defence. France, in consideration of the change likely to occur from the new elements in war now under consideration, has had recently her sea-coast re-examined by a high commission, representing all arms in her stupendous military organization; and the result was to order still further protection to numerous points on her seaboard, rendered accessible by light draught steamers mounting heavy ordnance, their forts to be garrisoned in time of need by the local militia, (*garde nationale.*) In England the call is for greater activity in material and permanent means of defence, particularly in the case of refuge harbors, such as Portland

and Dover, while the fortifications of her great arsenals have all recently been strengthened.

After mature examination, I am of the opinion that in a system of national defence forts cannot be dispensed with without entailing enormous expenditures for uncertain results. The invention of cannon and their constant improvements have changed the form of fortifications, and added to the size, durability, and massiveness of their construction. Now the invention of cannon was a greater change in the art of war than any that has occurred in this century, and with regard to one of the principal improvements of the day in destructive agents—*explosive shot*—the advantage has been given decidedly to forts.

On the other hand, if we cannot dispense with forts, can they not be modified? Is there no middle course? Fortifications in military science are regarded as a temporary means of resistance, by which an enemy is kept in check until relief is afforded.

In this view of their functions it seems probable that as, on the one hand, they might be more effectually assailed by steamers-of-war towing in heavy ships, both ships and steamers mounting the heavy ordnance which has been introduced, throwing *solid* as well as hollow shot, so, on the other hand, relief being more easily procured, their style of construction might be more economical. But this is a question belonging to the engineers.

It is one, however, which may be interesting just now with reference to fortifying our new coast on the Pacific—a work which surely ought not to be delayed. Here we are, as it were, building up another nation, and it must be built up with arms as well as arts; for without arms no nation was ever safe, much less great.

The position of Halifax, Bermudas, and the West Indies have been alluded to above in reference to our Atlantic and Gulf coasts. In the Pacific we have already outposts on our flanks, in the hands of first class powers. The French have a protectorate government in the Society Islands; they hold the Marquesas still nearer, with its superior harbors, and have been looking for years for some excuse for seizing the Sandwich group; for this is the only way to account for the manner in which they have ever countenanced the unjust and ungenerous demands of their agents in those islands. That they have not now possession of them is due, probably, to what has been stated of the determination of the government of the islands to hoist the American flag, and call upon the United States for protection or incorporation. It is impossible to estimate too highly the value and importance of the Sandwich Islands, whether in a commercial or military point of view. Should circumstances ever place them in our hands they would prove the most important acquisition we could make in the whole Pacific ocean—an acquisition intimately connected with our commercial and naval supremacy in those seas. Be this as it may, these islands should never be permitted to pass into the possession of any European power. Then we have British Oregon, with Vancouver's island, the Halifax of the Pacific coast; and last, though perhaps not the least, the Russian possessions of the Sitka, &c., in the north; and all these in an ocean above all others adapted to the use of steam.

The third inquiry submitted by the department is whether it be necessary or expedient to continue the system of fortifications on the shores of the northern lakes.

The first view of this branch of the subject would probably lead to the conclusion that, as we dispensed with forts during the war of 1812, we need them still less now; that the contiguity of the two frontiers will enable us to keep pace with any evidence of preparation on the other side; that our progress in population and resources, rendered so immediately available by the increase of water communication with all parts of the border States, especially with such important points as the city of Albany, which, in its turn, is connected with all sections of the country by its great river, railroads, and canals, was far greater

than any progress within the Canadas. Yet the advance there has been highly respectable, and very extensive public works, intimately connected with a system of defence, have been completed.

But this very progress on our lake frontier, showing itself in large and populous towns with a rapidly increasing commerce, all exposed to sudden assaults, naturally lead one to pause well before advancing the opinion that the general government is absolved from giving adequate protection to all exposed and important points, whether on our lake or sea-coast.

Why should not Buffalo and Oswego be protected, as well as Savannah and Mobile? Not by extensive and costly works, capable of resisting invasion or siege, but sufficiently strong not to excite the cupidity or daring spirit of an enemy, who, in a rapid incursion, might, as elsewhere, destroy an enormous amount of property before any resistance could be brought against him. To conduct a surprise may be difficult on the lakes; but we have had, within a few years, full proof that it is possible.

In case of a war with England her provinces will, in all probability, be invaded, and this invasion, according to the declaration of a distinguished citizen, will be one almost *en masse*. He predicts that an army of a hundred thousand men will march upon the heart and capital of the country, and settle all at one blow; that neither forts nor ships will be wanted; and that the rivers and lakes, instead of obstacles, would become bridges to the invaders. One cannot fail to be stirred up by this captivating picture; but in the only trial heretofore made upon Quebec the river was not found to be a bridge, and the campaign failed for want of one. Suffice it, however, to say, if we carry on war on a large scale without being governed by the art of war, by science, and past experience, we may, and doubtless will, still be successful; but this result will be obtained by an increased expenditure of blood and treasure.

While an army, however large, was marching upon a vital point, millions of property might be destroyed along the lake shores, making a heavy discount on the fruits of the victory, which might be prevented by moderate expenditures. Our large frontier towns, where great injury could be suddenly inflicted, should be protected from liability to a *coup de main* by forts of moderate dimensions, to be garrisoned, in time of need, by those whose hearths they shelter. All lake harbors, whose position, depth of water, and accessibility would render them important as refuge harbors to our own ships or to those of the enemy, should also be defended by adequate works. All materials not perishable should be gradually collected for the construction of ships and steamers. These preparations become invaluable where war threatens or comes; neither are they lost if it should not overtake us, for they may have had an important part in averting it.

In many particulars, and according to the opinion of men of the most experience, Ontario is the most important in the series of inland seas in a military point of view, and at this time the English steam tonnage upon it is greater than our own. This fact alone is one for consideration.

In connexion with the movements of large armies nothing has been said of fortifying *strategic* points on the line of offensive operations, because this question is a purely military one, and belongs so especially to another branch of the service that it would be mere presumption to touch upon it here.

Though not specially referred to in the questions under consideration, it may be expected that some notice will be taken of the facilities to be derived, in a system of national defence, from rapid railroad intercommunication and transportation. These certainly can confer a great and real benefit, amounting, perhaps, to positive exemption from the possibility of invasion. An army, with its baggage, can accomplish an ordinary march of twenty-five days in one day, and reach the terminus without fatigue, all ready for fight. The experiment of transporting troops in this way has already been tried in France, and, more

recently, the emperor of Russia has been amusing himself by sending his guards, with their artillery, to and fro between his capital and Moscow, with entire success. But it is a misapprehension of means and ideas to suppose that the necessity of coast defences will be done away with because we possess the power of transporting the militia from the interior to the seaboard in the briefest space conceivable. Are our farmers, mechanics, merchants, doctors, and lawyers to constitute the defence of our maritime frontier? Are they, in time of war, to sleep with their knapsacks on their backs and their muskets by their sides, and be ready at the sound of bell or steam-whistle to leave families and business to man floating batteries in or near our seaports, or sounds, or rivers? Besides, mere numbers, though they may prevent an enemy from *landing* on our shores, cannot prevent his ships approaching near enough to hurl destruction among themselves, destroy cities, and burn shipping.

But if we are to rely upon railroads as one of the modes of repelling sudden attacks, having for their object the destruction of property or the levying of contributions, it will be well to inquire as to the amount of dependence that can be placed upon them. The utility of a road may be destroyed in a few minutes by very little exertion; a single rail removed will cause delay if not a serious accident. During the last revolution in Paris troops were thus prevented from reaching the city from the departments. In time of war, for those roads at least which lie along the coasts, a system of frequent inspection may be necessary, and means of repairing injuries kept at hand.

In the first part of this report it has been stated that, however complete our system of fortifications may be made, a large sphere of action in a scheme of national defence will still devolve upon the navy. The general effect of fortifications is to exclude war from our borders, and contribute to the inestimable advantage of leaving society in an undisturbed state, pursuing its usual avocations. A navy becomes efficient just in proportion as it is relieved from harbor defence; and in a war even defensive in its origin and object the navy in almost every case must assume an offensive attitude. We lose the vantage-ground if we wait the assault of an enemy. One would suppose there could scarcely be a dissenting opinion in reference to this point; that the special function of the navy, in war, is to be aggressive. Our able engineers, and especially their present distinguished chief, in the admirable reports they have been making for years on this subject, invariably assign this high and all-important position to the navy.

General Cass tells us, "Our great battle upon the ocean is yet to be fought, and we shall gain nothing by shutting our eyes to the nature of the struggle." Similar views are held abroad as to the true sphere of a navy. The Duke of Wellington, while urging increased activity in the permanent defences of Great Britain, in the strengthening of forts, the construction of barracks, and *place d'armes* to be walled in, still considers the navy of England, through its powers of *aggression*, its most essential defence.

The extraordinary expansion of this country and its development in every department, shown especially in a commerce which, long since whitening every sea, has received a marvellous stimulant recently, by the accession of a thousand miles of coast on the Pacific, by new channels of trade, and by the modifications in the navigation laws of our great competitor, should lead all reflecting minds to consider how great would be the revulsion in our prosperity if, through any untoward event, we should lose the means of protecting this commerce. Standing now in the front rank with our great commercial rival, shall we neglect an old aphorism of Sir Walter Raleigh, most cogent still: "Whosoever commands the sea commands the trade, and whosoever commands the trade commands the riches of the world?"

Now, is our navy, in point of efficiency and numbers, what it should be? Our statesmen constantly allude to it as the right arm of the nation's power;

yet has this arm been kept in any degree of vigor commensurate with the work it may have to perform or in keeping with our position among the nations? Is it equal to the ordinary exigencies occurring almost daily? The law passed some years since limiting the number of seamen still exists. Since its passage our commerce has nearly doubled, and our squadrons are too small to give it adequate protection or to keep up a healthful spirit and experience in the naval profession. Recently the government had not at its disposal the means to prevent an unlawful aggression on the territory of a friendly power; nor was the force sufficiently respectable afterwards to infuse, by its presence alone, a little mercy into Spanish justice. But are we yet through with this question of Cuba? Are we not threatened with a foreign intervention? At any rate, does it not offer another striking instance to be added to the long list of dangers which, at different periods, have suddenly sprung upon us, and to which this day of special international amity has proved no exception? The French claims, the north-eastern boundary, the affair of the Caroline, the Oregon controversy, have all shaken for the time being our relations with the two most formidable powers of Europe—formidable to us only because they have powerful navies—a collision with either of which would be rather a different affair from that with our neighboring republic, with whom similar disturbances ripened into actual hostilities.

The naval power of England is greater than ever before in her history, and the disparity between us is yearly increasing, particularly in her steam navy. In the admiralty navy list for April, 1850, we find one hundred and fifty steamers of war; of course many of these are already obsolete in construction and machinery, but she is building new ones and launching numbers every year. In addition to these, especially constructed for war purposes, she has between sixty and seventy mercantile steamers, capable of being armed with thirty-two pounder cannon, for which the guns, carriages, and ammunition are *actually* prepared. She has, still further, two hundred and forty more, capable of mounting a lighter armament, and some six hundred besides, which might be of service to resist invasion from her neighbors. Exclusive of her squadrons abroad, which are large and efficient, with a due proportion of steamers to each, in January, 1851, she had in commission at home fourteen sail of the line, three of them screw steamers, ten frigates, four of them steamers, besides several steam sloops, all ready for sea. She has also ready for commissioning twenty other powerful steamers, viz: eight large frigates and twelve sloops.

The training of officers and men is in full keeping with this colossal force. Her squadron of evolutions offers the finest school for both, and the gunnery ships are making her able seamen expert artillerists, good swordsmen, and capital shots with pistol and carbine.

The navy of France is also powerful; it has risen entirely from its almost total extinction during the long and bloody contests from 1789 to 1815. In steamers of war, at the commencement of this year, she had one line-of-battle ship of ninety guns, with screw propellers, fourteen steam frigates of first class, mounting from eight to sixteen guns of heavy ordnance; fifteen steam corvettes, and forty despatch steamers, most of them mounting from two to four shell-guns.—(See Etat Général de la Marine et des Colonies, for February, 1851.)

Both these navies have reached the highest state of efficiency, skill, and discipline, and their *morale* never was higher: that of England, roused to the maintenance of its boasted supremacy on the ocean; that of France, burning for an opportunity to show the world that its practical skill is *now* equal to that science and bravery which were ever conspicuous.

When completed, we shall have in our navy five steam frigates and one steam sloop. These vessels mount or will mount from six to ten guns, some of them of large calibre; they are strong, well-built, and efficient vessels, one or more of them quite equal, if not superior, to anything of the same class abroad. But this statement, compared with the two made above of the navies of England

and France, shows terrible odds against us. It is well to remember this; but it is not exhibited here with the intention of making it the basis of an argument to show that we should set to work and erect such fleets here. The temper of our people in relation to any such expenditures has already been spoken of, and there is no desire to advocate extravagant cost for contingent advantages.

But this disparity between us and other nations in our means of offence and defence, already so great, is yearly increasing. How is it to be got rid of or lessened? The reply is often made: Has it not ever been so? was it not quite as great when we went into the war of 1812? And it may well be asked how that disparity was overcome in that memorable contest. In the first place, it was lessened by the skill, courage, and coolness of our officers, united to the fine spirit, good gunnery, and high discipline of the crews. In the second place, by a process equalling the greatest piece of *strategy* ever performed on land by the greatest military captains. We built frigates which in size, calibre of guns, and in the brave hearts who took charge of them, literally struck off from the British navy list everything below a line-of-battle ship, at least so far as these frigates were concerned.

The first encounter of our frigates with theirs astounded Britain. In accounting for her defeats, it was natural for her only to have seen the disparity in *size and armament*, but the official account of these frigates shows something more, and this is now acknowledged with becoming candor by some of her distinguished men. Sir Francis Head, in a recent work, says: "Gunnery was, in naval warfare, in the extraordinary state of ignorance we have just described, when our lean children, the American people, taught us, rod in hand, *our first lesson in the art.*" Certain it is that the British admiralty board thought it necessary to put a stop to what they conceived to be a very unequal contest, and accordingly intimated confidentially to the captains of their ships that they did not conceive that any of his Majesty's *frigates* should engage single-handed the larger class of American ships, which, though they may be *called* frigates, are of a size, complement, and weight of metal much beyond that class, and more resembling line-of-battle ships.

Now, can we not once more render obsolete one-half or two-thirds of the English and French navies, and compel these powers to remodel their steam as well as sailing ships? It is the opinion of officers who have closely examined this subject, aided by actual experiments, that we have not yet reached the maximum point in the use afloat of heavy ordnance.

It is proposed to build ships that will carry guns of larger calibre and longer range than any heretofore used; to have auxiliary steam power, with the machinery out of reach of shot or shell, to be disencumbered of side-wheels, and, when not using this auxiliary power, to be fast and manageable under canvas—very much such a ship as the Princeton was, on a larger scale, and with the improvements which seven years have introduced. All candid minds will now admit that the conception and principle involved in the construction and armament of this ship was in advance of her day, for in casting round we have found nothing combining so many requisites for a steamer of war.

The advantage of guns with long ranges is feelingly dwelt upon by Sir Francis Head, already quoted. Speaking of the American navy in the last war, he says: "They not only converted their seamen into practiced gunners and expert artillerymen, but, by substituting long guns instead of our short ones, they secured for themselves the immense advantage of being able, without loss or danger, *luxuriously* to *pummel* us to death, at ranges at which they had precalculated they would be completely out of our reach."

It would seem unnecessary to mention that all improvements in the implements of war, the moment they are proved effective, will, of course, be seized upon by other powers, for concealment in these matters is no longer attempted. But the great point to be gained is to compel these powers, as it were, to

start, *de novo*, with us, and to render comparatively valueless their gigantic naval establishments. In the building of a steam navy we have scarcely commenced, and it is rather mortifying to think that even Spain has as many steamers of war as we have. Candor compels the admission, however, that circumstances have greatly favored us, and though this extreme economy or indifference might have cost us dear, certain it is that many millions of dollars have been saved by the delay. England and France have been going through the usual costly process in such matters before reaching a measure of excellence—one improvement almost immediately laid aside for another, and this one as rapidly giving way to something still better; while all this time we have been dealing most sparingly with this very expensive agent, steam power. But now that a great degree of perfection has been reached in its application, that the science and mechanical skill of the country are at so high a point, that our wealth and resources have so increased, shall we continue to refuse a *reasonable* measure of preparation for future exigencies?

Allusion has been made to the assistance England is prepared to receive from her mercantile steam vessels; and it may be said we have the same resources, so far as they go, of falling back upon our splendid mail steamers. These vessels would doubtless prove serviceable in many ways; they may carry a few guns of very respectable, though not of the largest calibre; built for speed, they would be admirable despatch vessels, serve to reconnoitre with safety the movements of an enemy, give warning of his approach, and the amount of his force—in short, be what Nelson termed his frigates, "the eyes of the fleet." But these steamers cannot form the *basis* of a steam navy; such an idea would be fatal to our naval efficiency. It is not intended by this to object to government's giving adequate protection to these mail steamers, in order to carry out the international postal arrangements. But they are not such steamers as the government would now build for war purposes; the side-wheel may be said to be almost obsolete, and their machinery is altogether too much exposed to shot and shell; ships so costly must, at least, be made less vulnerable. But if the mail steamers are to be depended upon, as our steam navy, and not as auxiliaries to it, as the English and French mercantile steamers are to their navies, then another question presents itself. At what stage of an impending emergency is the government, in conformity with the right granted in the contract, to take these steamers?

If this be deferred until a late moment, there may be no time to fit them for war service, for very material alterations will have to be made. If further deferred, until hostilities break out, they certainly will not be ready for the first brush, and half of them may be picked up abroad by the smallest armed cruiser. Should they be taken by the government prematurely, their business and profit are broken up, and pass into the hands of their rivals, who may run their steamers to the last moment consistent with safety; for by the other powers, as stated above, they are only held as auxiliaries.

A few alarms, then, leading to no rupture, may saddle the government with a class of steamers not fit for the navy proper, to be disposed of at an enormous loss; for the alterations which will have been made to convert them into "men-of-war" will have wholly unfitted them for their peaceful pursuits; just as much so as the exorbitant expenditure for the luxurious accommodation of passengers is wholly unnecessary for a steam frigate. In truth, in the transfer of these mail steamers this item may be so great that it should not be altogether overlooked. It has been stated that the saloons, cabins, and decorations of one of these lines have cost from one hundred thousand to one hundred and twenty thousand dollars per ship, which, of course, must be paid for, though not one dollar of it would be required for naval use. Two iron hooks to swing his hammock, make the birth of the seaman, and a few pine boards compose the bunk of the officers.

In conclusion, whatever may be decided in relation to the national defence by

fortification, whether these be continued, extended, or modified, I beg leave to express an emphatic dissent from all theories having for their object the substitution of active ships-of-war for permanent works. This would be placing the navy in a false position before the country; giving it duties to perform for which its organization is inapplicable; preparing for its future discredit and loss, through failures to execute that which should never have been undertaken, which is not embraced in the general scope and design of a naval establishment.

To retain the navy for harbor defence was entertained at the commencement of the last war with England; the proposition to do so sprung from the apprehension that it could not compete with the vastly superior English forces upon the ocean. But at that time some brave and sagacious officers in the high ranks saved the navy from the fate that threatened it, and to these gentlemen it owes all its subsequent honors, usefulness, and prosperity. If any such ideas prevail, at this day, in or out of the profession, those holding them would do well to pause and consider what the navy would have lost, and what the country would have lost, if our ships-of-war had at that eventful period been deprived of the opportunity of filling so bright a page in the nation's history by their achievements upon the ocean. In this connexion an eloquent passage in the speech of a great statesman is recalled, delivered in the Senate of the United States in 1838. After alluding to our being at war with England, at a moment when she had gained an ascendancy on the seas over the whole combined powers of Europe, and quoting the familiar verse of her poet,

"Her march is o'er the mountain wave,
Her home is on the deep,"

Mr. Webster says: "Now, sir, since we were at war with her I was for intercepting this march; I was for calling upon her, and paying our respects to her at home; I was for giving her to know that we, too, had a right of way over the seas, and that our officers and our sailors were not entire strangers on the bosom of the deep; *I was for doing something more with our navy than to keep it on our shores for the protection of our own coasts and our own harbors;* I was for giving play to its gallant and burning spirit; for allowing it to go forth upon the seas, and to encounter on an open and an equal field whatever the proudest or the bravest of the enemy could bring against it. I knew the character of its officers and the spirit of its seamen, and I knew that in their hands, though the flag of the country might go down to the bottom, while they went with it, yet that it could never be dishonored or disgraced.

"Since she was our enemy, and a most powerful enemy, I was for touching her, if we could, in the very apple of her eye; for reaching the highest feather in her cap; for clutching at the very highest jewel in her crown." * * * *
"The ocean, therefore, was the proper theatre for deciding this controversy with our enemy; and on that theatre my ardent wish was that our own power should be concentrated to the utmost."

It would be ill suited, indeed, to the spirit of this nation to retain its naval forces in its own waters during a war, especially if that war was with a naval power. Steam, this new element in the affairs of the world, has very materially changed our position with reference to other nations. Our distance from Europe, measured in time, is now reduced to a brief period of ten days. These United States have hitherto been advancing the general cause of human liberty by an active and progressive peace; but do not events abroad more and more indicate that we may, at no distant day, be forced into our own defence—to aid this cause of freedom by an active war?

Respectfully submitted.

S. F. DUPONT,
Commander United States Navy

No. 5.

Report of Lieutenant J. Lanman.

NEW YORK NAVY YARD, *September* 20, 1851.

SIR: In obedience to the within order of the honorable the Secretary of the Navy, I have the honor to submit the following, as the result of my best reflections upon the subject referred to in your communication of the 17th June last, addressed to the honorable the Secretary of the Navy:

1st. "To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?"

The great change produced upon all maritime nations by the application of steam must, of course, have a most important bearing in regard to the system of our national defences, as adopted in the year 1816, and that system most applicable to the same purpose at the present day.

I desire to say that should a foreign power design hostilities against the United States, their steamers, with transport ships in tow, would not attempt to pass our fortifications, but could land thousands of troops upon our shores at the numerous points convenient for so doing, and free from the annoyance of any battery.

At the same time, I conceive it all important that our seaports should be protected; yet the great improvements made in projectiles, and the advancement in the science of gunnery would suggest that our fortifications need not be so extensive, and consequently erected at much less expense. Though I would not demolish any of the works now completed, yet those being erected could be so modified as to receive the heavy armament of the present day, and be finished at much less expense than by carrying out the designs of fortifications planned many years since and not yet completed.

2d. "What reliance could be placed on vessels-of-war, or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?"

In reply I would say that great reliance could be placed on war steamers of moderate draught of water, armed with our efficient eight and ten-inch columbiads, as they should at all times be in readiness to take in tow any armed vessels at the naval station, and in a few hours from port could oppose the landing of the enemy upon any part of the adjacent coast.

Sailing vessels of the commercial marine and river steamers, (suitable for the purpose,) would be available means of transporting troops to oppose the landing upon our shores of any hostile force.

Floating batteries and gunboats, and other temporary substitutes for permanent fortifications, I conceive to be heavy expenditures of the public treasury and not of the least possible benefit to the government. Of course I would except such temporary means of defence as a case of emergency might demand, when the people of our country are ever ready to look out for themselves.

3d. "Is it necessary or expedient to continue the system of fortifications on the shores of the northern lakes?"

The same answer will apply to those works that I have made in regard to the fortifications on our seaboard. Those unfinished should be modernized, and

those in service armed with projectiles and otherwise adapted to the improvements of the year 1851.

I have the honor to be, sir, your obedient servant,

JOSEPH LANMAN,
Lieutenant United States Navy.

Hon. C. M. CONRAD,
Secretary of War.

No. 6.

Report of Lieutenant M. F. Maury.

NATIONAL OBSERVATORY, *Washington, August*, 1851.

SIR: I have received a communication from the Secretary of the Navy, covering the copy of a letter from yourself of June 17, 1851, requesting him to communicate certain resolutions of Congress concerning land defences and fortifications to several officers of the navy, and "to obtain their separate opinions in writing" upon the following points, viz:

1st. "To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?"

2d. "What reliance could be placed on vessels-of-war, or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?"

3d. "Is it necessary or expedient to continue the system of fortifications on the northern lakes?"

The resolutions are:

"1st. *Resolved*, That the Secretary of War be directed to report to this House, the second Monday in December next, on the subject of the land defences of the country, in which he will review the general system adopted after the war with Great Britain, and since pursued in regard to the permanent fortifications then deemed necessary for the national defence; and that he report whether the general plan may not now be essentially modified by reducing the number of works proposed to be erected, and by abandoning some of the forts now in progress of construction."

"2d. *Re olved*, That the Secretary of War also report the number of fortifications which have been built, including those nearly completed under the general system, the number in progress of construction, and the number not yet commenced, but proposed to be erected, and in such form as will conveniently show the States and Territories in which the several forts are situated or to be located, when the work was commenced, when completed or expected to be finished, the number and calibre of the guns mounted or to be mounted, the estimated cost, the amount expended, and the sums yet required to finish or construct, as the case may be, each work."

I am directed by the Secretary of the Navy to give this subject my "best reflections, and to communicate the result to the Secretary of War."

To make clear the result of my reflections upon this subject it is first necessary to pass, at least briefly, in review the condition of the country immediately preceding the year 1816, when the present system of fortifications was adopted, and to contrast the condition and military resources of the United States then, with their condition and military resources now.

In 1816 our population was eight millions; we had just come out of a trying and expensive war with the most powerful nation in the world; our soil had been invaded, the Capitol burned, towns had been besieged, villages laid waste, and the people greatly harassed by the presence among them of an insolent foe.

The application of steam as a motive power, even to river craft, was but an experiment, and men had not yet waked from their dream in which they first saw upon the ocean visions of steam navigation. Railroads had not then begun to thread themselves over the country, nor had the first telegraphic wire streaked the horizon. The country had been and might again be invaded; the alarm could be spread only at the rate of one hundred miles a day; and to repel the enemy our generals could bring up their forces only at the rate of what, in this day of steam and railroad car, would be considered as a snail's pace; twenty miles was a good day's march for an army.

Under these circumstances, with the horrors of war and the dread of invasion fresh in the minds of the people, it was natural that the attention of the government should be directed to a system of defence along our borders which, in another war, should make the weak points strong, the salient impregnable, and the exposed, the rich, and the tempting secure; thus rendering the country in another war safe from invasion. Accordingly, the plan was to line the seaboards with forts and castles, which should oppose the advances of the enemy, beat him back, resist sieges, and support garrisons for defence, until reinforcements should arrive or the patience and the energies of the assailants should become exhausted. Under these circumstances the present system of fortifications was commenced.

For defending the approaches to any particular part of the coast, the engineer, in planning his works, had to take into account the importance to us of the place to be defended; the importance which the enemy would probably attach to its occupation by himself; and the force that he would or could, probably, bring against it. Also, an element which entered largely into the engineer's plans was the kind of force, the calibre of guns, &c., that his fort would have to withstand.

But since that time great changes have taken place. The relative importance of ports and harbors, and places to be defended along the coast, has greatly changed. The implements of warfare and the means of attack and defence have changed; structures that were well calculated to resist the batteries of the best appointed ships in 1816, would now tumble down before the appliances of modern warfare. The improvements which have since taken place in ships, their armaments and locomotion, are vast; and therefore works may be found along our coast which, though sufficient in their day, would now be wholly inadequate to the purpose for which they were intended.

At best, a fort can actually defend so much of the coast only as lies within the range of its guns; outside of this range an enemy may disembark an army, land his heavy ordnance in the very sight of the strongest castle, as we ourselves have since done at Vera Cruz, and proceed to invest, from the rear, the strongholds of the country. It was therefore practicable for a bold and dashing enemy, notwithstanding the powerful and costly works at Old Point Comfort, in Virginia, to land in sight of these works an army, in Lynn Haven bay, march up to Norfolk without coming in reach of the protecting battery, and invest the city and the navy yard—the very places the guns of these forts were intended to protect.

True, it was practicable to erect works of defence at Lynn Haven bay; but being erected, the sagacity of our engineers perceived there were still other places and times at which an enemy might land and march up to Norfolk without once coming in range of the Lynn Haven guns. The country saw this, and perceived that effectually to prevent an enemy of naval resources from landing on our coast in war would require a structure but little short of a

Chinese wall, with bastions mounting guns to range and rake every point, from one end of our extended sea-front to the other.

Solomon's exchequer could not withstand the drafts which such a complete system of defence would make upon the treasury; and neither the minds of the people nor the purse of the public was prepared to incur it. Accordingly, the most important points were selected for fortifications, which, even if completed, would not have protected the country from invasion; they would only have prevented the enemy from anchoring with his fleet in the most safe roadsteads, and from landing with his forces at the most convenient places, and from battering down our cities with the guns of his men-of-war.

And upon the carrying out of this system, as incomplete as it necessarily was, there was involved, according to the estimates of the most skilful and accomplished engineers, a sum of money which it would be difficult for the imagination to conceive, for it required eight or nine places of figures to comprehend it, so enormous was the amount.

While this system, expensive and defective as it was, was in progress, commenced those changes in the country to which I have alluded; a change of population from eight to twenty odd millions, in the means of spreading the alarm of an intended invasion; a change from the signal fire on the mountain and the horse and his rider, to the fiery footed messenger of heaven, to raise the country. For the foot pace of twenty miles a day, as the weary rate of our advancing armies, a change which ties infantry, cavalry, and artillery all to the tail of the iron horse, mounts them on railroads, and speeds off with them at the rate of twenty times twenty miles a day, with the ability to land them at the appointed place at the appointed time, refreshed with the ride and ready for battle; a change in ordnance and missiles of death, which are far more destructive and much more terrible in battle than any ever known in the annals of military warfare, Anno domini 1816.

These changes are enough to revolutionize the system of coast defences. They have rendered effete in part the system of 1816.

Railroads are now already completed, or actually in process of construction, leading from New York up among the granite hills of New England—back to the lakes and beyond the mountains—cuts the great Miami bottom, and spreading themselves out over the rich prairies beyond.

From Norfolk they go north and south, and are ramifying themselves far away into the back country, with the intent of reaching the very heart of the nation in the good valley of the west.

Now, were it possible for an enemy, with the greatest army that ever was led into battle by the greatest captain, to take the country by surprise, and to land at Long Island sound, or in Lynn Haven bay, and to be disembarking his last piece of artillery before he was discovered, these railroads, the power of steam, with the aid of lightning, would enable the government, before he could reach the heights of Brooklyn, or the outskirts of Norfolk, to have there in waiting and ready to receive him and beat him back into the sea, a force two to one greater than his, however strong.

Suppose that in 1847 there had been in active operation between Vera Cruz and the city of Mexico a line of magnetic telegraph and such a railroad as is the Erie road of New York, can it be supposed that our generals, being cognizant of the facts, would have so much as entertained the idea of landing there as they did and laying siege to the town.

All the world knows where our railroads are, and that the country is protected from military surprise and invasion from the sea by a net-work of telegraphic wires; the mere knowledge of the fact that Norfolk and New York can bring to their defence such resources will forever prevent even the thought in the mind of an enemy of landing in force at Lynn Haven bay or on Long Island.

Those roads, therefore, render a siege to any of the works of defence before those places out of the question.

To lay siege to any place along our sea-front involves not only the disembarking of an army, but the landing also of the siege-train. This requires time.

From the time that the head of our invading column jumped out of the boats, up to their waists in the water, at Vera Cruz, till General Scott was ready to send his summons to the city, was thirteen days, and it was four days more before his heavy artillery drew overtures from the besieged—total, seventeen days.

Imagine an army, the best equipped it may be the world ever saw, that should attempt to beleaguer one of our strongholds for seventeen days. Within that time we could bring against him, by railroads and steamboats, millions of the freemen, which this country ever holds in reserve, to fight its battles. It might be Boston, before which this imaginary army is supposed to set down in imaginary siege, or it may be New York, Philadelphia, Norfolk, Charleston, or New Orleans—it is immaterial where. In less than half the Vera Cruz time we could throw millions of men into any one of these places, and subsist them, in the meantime, by a daily market train of cars and steamboats, catering for them in the abundant markets of the Mississippi valley.

It is impossible that any army, however brave, spirited, and daring, should ever think of invading a country like this, and attacking us upon our own ground, when we have under our command such powers of concentration and such force in reserve as twenty millions of freemen, the electric telegraph, the railroad car, the locomotive, and the steamboat.

The present system of fortifying the coast is founded on the principle of making the fortifications "strong in proportion to the value of the great objects to be secured."*

This is the principle upon which every system of national defence must rest; and as to this principle itself there can be no difference of opinion. The question is, in what shall the strength of a fortification consist? For a fortification that is strong against the most powerful weapons and modes of attack known to our age may be weak before those that the inventions and improvements of another age may call forth.

In the feudal times castles were built to enable those within to withstand the attack of spearsmen and archers. These old castles were strong in their day, but in ours they are impotent and of no avail.

The fortifications of 1816 were built to withstand the armaments which were mounted upon the ships of that day; and what were they?

In 1812 the Duke of Wellington, when preparing to besiege Badajos, wrote to Admiral Berkley, commanding the Lisbon station, to request the loan of twenty twenty-four pounders from the fleet. Admiral Berkley, in reply to the request for twenty-four pounders, stated that no ship under his command carried guns of so *heavy* a nature; but offered to supply twenty eighteen pounders, with carriages and ammunition complete.† It would be difficult to find now-a-days any ship in any fleet with guns so small as a twenty-four pounder.

Now it has been proven, or made probable, that it is practicable to put on board ships, carry to sea with safety, and manage with effect, long guns with a calibre for shot of one hundred and thirty-five pounds at least; and it would be as reasonable to expect a fortification which was built to resist shot of eighteen or twenty-four, or even of thirty-two or forty-two pounds, to withstand the concussion of shot of one hundred and thirty-five pounds weight as it would be to

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* See report of the board of army officers, 1840, on the military defences of the country—a paper that is drawn with great ability, and to which I shall occasionally refer. It is contained in Pub. Doc. No. 206, House of Reps., 1st session 26th Congress.

† Journal of Sieges in Spain and Portugal, vol. 1, p. 145.

expect a thirty-two pounder to strike harmlessly against a wall which was built only to resist a ten pound shot.

In 1816 our fortifications had to be provided with the means of withstanding sieges. Hence, they were required to be as strong in the rear as in the front, and to be equally invulnerable from every direction. But now steam and electricity render our seaboard fortifications invulnerable in the rear and protect them against sieges. Attempts to carry by storm may be made; but as for an enemy who sees and understands, as the leader of every army must see and understand, the powers of concentration which steam gives us—as for such an enemy to think of setting down before one of our strongholds and proceeding regularly to invest it, by executing parallels, building fascines, digging trenches, throwing up enbankments, making approaches and the like, it is out of the question. Our railroads perfectly protect the entire coast line from Maine to Georgia from any such attempt. We may be blockaded by sea, and harassed from ships, but we cannot be beleagured on the land.

These are the changes which have rendered necessary a change in the whole system of national defence, and the *chief stationary works of defence* which we now want along the Atlantic seaboard, are those that will protect our *cities and towns* from the great guns of big ships.

We may admit, in imagination, now, a dashing enemy again into the Chesapeake; we may suppose him landed, with all his forces, and to be, without opposition, in the act of taking up his line of march again for this city.

Now, is it not obvious—supposing the country to be in a reasonable state of preparation at the commencement of war—supposing this much, is it not obvious, by sending telegraphic messages, and using the powers of steam for conveyance, the American general might sit down here, in Washington, and at daylight the next morning commence an attack upon that enemy, both in front and in rear, with almost any amount of force, consisting of regulars, volunteers, and militia, that can be named. Retreat, for such a foe, would be out of the question, and re-embarkation an impossibility.

Therefore, so far as the system of 1816 was intended to defend the country from invasion along the Atlantic seaboard, steam, railroads, and the telegraph have rendered it as effete as did the invention of fire-arms the defences which the military science of that age had erected against the shafts of the archer.

It is not going too far to say that, as for invasion, we might raze every fortification along the Atlantic coast without exposing the country to the danger of being overrun by an enemy in war. He might, in such a case, take possession of our seaports, destroy our dock yards and arsenals, and do an incalculable amount of mischief, but as for his venturing to leave the strongholds on the seabord, and attempting to penetrate, even for a few miles into the interior, would be out of the question.

He would be besieged from the moment of his landing; he might return to us our cities in ruins, our dock yards in ashes; but as for invading the country, and marching his armies over it from place to place, our steam machines forbid it. Hence I maintain, we now want fortifications only to do what railroads and steam never can, viz: as before said, to protect our *seaport* towns from the great guns of big ships.

Suppose the system of 1816 to have been completed; that the fortifications therein contemplated had all been built, provisioned, equipped, and garrisoned. Now, saving only those which protect the large cities from the guns of men-of-war, suppose the alternative should be presented to our military men, whether they would undertake to defend the country from invasion, with such a complete system of fortifications, but without the assistance of railroads, steamers, and telegraph, or with the assistance of railroads, steamers, and telegraph, but without the aid of the fortifications.

I suppose, could such an alternative be submitted to every officer of the army,

from the oldest down to the youngest, that there would be but one answer, and that would be, "down with the forts, and give us the railroad, the locomotive, the steamboat, and the telegraph."

I do not mean to advance the opinion that railroads, steam, and the telegraph, with the military powers of concentration which they give us, have rendered fortifications *entirely* useless. By no means: steam and electromagnetism on the land can do but little against the tremendous power of armed ships on the water; and if these can bring any one of our large cities within the reach of their guns, its destruction is inevitable, despite all that the powers of the loco-*our* motive and the telegraph can do. It is chiefly *to keep such ships from burning cities and havens*, within reach of their broadsides, that we want forts and castles.

Therefore seeing that, in 1816, when the present system of defending the coast was planned, railroads and the magnetic telegraph were unknown, they now ought to involve modifications of that system. In military operations they are powerful auxiliaries. They introduce new elements and new features into the arts of war; they bear upon the whole system of attack and defence. They, therefore, cannot fail to make necessary certain modifications in any system of coast defence which was planned without regard to them.

With this exposition of my views, I proceed to answer your first question, viz:

"1. To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?"

Let us first consider the modification applicable to the Atlantic seaboard, and then those that are applicable to the Pacific.

The only fortifications that are wanted along our Atlantic seaboard, except those at Key West and the Tortugas, at Ship island, and at one or two more such places, are those which will protect our cities and towns from the broadsides of men-of-war.

The forts already completed, or well advanced towards completion, are believed to be sufficient for this. They should, however, be mounted with heavier ordnance, and pieces of the most effective calibre for throwing explosive shot and shells.

In 1840, the House of Representatives, by resolution of April 9th, called upon the War Department for a report—among other things, "of a full and connected system of national defence."

The subject was referred to a board of engineer officers, who presented their views in a masterly manner. I have before referred to this well-drawn paper, and shall have frequent occasion to refer to it again. That report sustains the system of 1816. The source whence it comes entitles it to far more weight than is attached to any of my opinions. Nevertheless, honestly differing with that board in some of its positions, I hope I may be permitted to express that difference of opinion without laying myself liable to the charge, from any quarter, of want of respect for the distinguished officers who composed that board.

That report, which is by far the most able paper that I have seen in favor of the system of 1816, does not contemplate any guns for our fortifications heavier than a forty-two pounder, or an eight-inch howitzer; of course I speak technically, and do not allude to mortars.

It may be considered as a fact pretty well established, that two or three explosive nine or ten-inch shells, well aimed and properly planted, are enough to tear out the side of the largest ship, and completely to disable, if not wholly to destroy her.

I quote from the experiments made with nine-inch explosive shot, in the harbor of Brest, upon the Pacificateur, an eighty-gun ship.*

* Vide an account of experiments made in the French navy for the trial of shell guns, &c., by J. H. Paixhan s Lieutenant Colonel—translated from the French by Lieutenant John A. Dahlgren, U. S. N.

The peice to be fired was mounted on a small pontoon, and planted off upon the water to the distance of about six hundred and forty yards from the eighty-gun ship, which was to be the target.

The experiments were made in the presence of a number of the most eminent officers in the French navy.

The first shot sufficed to determine opinions; but, to complete the evidence, twelve shots were fired.

The following is a summary from the official report on the occasion:

"The first shot struck low, and, as soon as the explosion was heard the commission repaired on board. A thick smoke filled the between decks, where the bomb had burst. The fire engine was worked and the smoke lasted ten or twelve minutes; the bomb had made a breach of eight and a half inches in diameter in the ship's side, which there was twenty-nine inches thick; it had torn off two feet of the inner plank and then exploded; made a hole in the orlop deck of two to three feet square, kncoked away and shattered to atoms more than one hundred and sixty square feet of timber.

"The second gun traversed the quarter-deck, carrying with it two peices of plank, one of which was five and a quarter feet long, then striking the mainmast obliquely, it knocked off a splinter from three to four feet long and nine and a half inches thick, and bursting, tore away a mast band ten and a half feet in circumference, weighing one hundred and thirty pounds; this mass of iron was driven with such a force that one of its halves struck the opposite bulwark, seventeen feet distant, where it flattened and adhered. The splinters of the bomb shattered the bitts, cut some of the braces, and would have injured many men and articles of rigging if the ship had been equipped. The explosion also set fire to a coil of rope.

"The third bomb entered the side, between two ports, struck and tore off an oaken knee seven feet five inches long and six and a half to thirteen and three-quarter inches thick, which, with its iron fastenings, weighed more than two hundred and six pounds; then bursting, its splinters knocked down forty of the wooden figures nailed around the guns to represent men. The explosion also shattered one of the beams supporting the deck above, starting several planks, one of which was ten and a half feet long, and another five and a quarter feet," &c.

"To abridge this detail, I will," says the reporter, "only refer to the two most remarkable shots of the remaining nine.

"Perceiving that the bombs always passed through the side of the vessel, the charge of the gun was diminished each time. With four and a half pounds of powder, and always at six hundred and forty yards, a bomb struck in the wood, between two ports, and burst, tearing away the frame and planking, and making a breach of several feet in height and width, so shattered that all present thought that *the shot would have endangered the vessel* had it taken effect near the water-line.

"Besides this, two pieces of the iron work, weighing sixteen pounds, were driven in board by the force of the explosion, and nineteen figures knocked down.

"Finally, the twelfth and last bomb, with the same small charge and at the same distance, struck the corner of a port, knocked away a heavy piece of iron work, and lodged on the other side of the ship against an iron knee five and a quarter inches in size and firmly supported; the blow made three fissures in the iron, two of which were four and a quarter inches thick; and the bomb still unbroken buried itself further in the side, burst, and knocked down twenty figures."

As to the havoc made upon a ship by these projectiles, the French commis-

sion was of opinion that it was "so terrible and so great that it is thought that one or two bombs of this kind bursting in a battery would make such confusion as to cause the surrender of the vessel, or at least conduce materially to it;" and "to produce, by the power of the bomb and its splinters, such damage in the frame that if the explosion should take place near the water-line the vessel would probably sink. There is no doubt on this subject," it was added, "as may evidently be perceived from the result of bomb No. —, which, had it struck a few feet lower, would certainly have done irreparable mischief,"

That any ship "must *unavoidably give over the attack* on being struck with a few shells."

"That it would be very useful to mount these guns either on floating pontoons, gunboats with sweeps, or steamers; and it is thought that for the *defence of roads and coasts*, or for attacking ships in a calm, or on a lee shore, the success of the bomb cannon would be infallible."

Furthermore, that commission of distinguished men also expressed the unanimous opinion "that these shell guns would be of incalculable utility in *coast batteries*, gunboats, or launches, bombardment, floating batteries, steamers," &c.

The subject was brought before the Academy of Science, and the opinion of the board were indorsed by that body after full deliberation.

Subsequently a second trial was made upon the same ship in the presence of another board of officers, with like results. This board, after a full discussion as to the effect of these shells, gave it as their opinion likewise, that "their power is so terrible that should one or two bombs of this kind burst in a battery, the vessel would be rendered untenable; that the explosion of a bomb in the frame of a ship would be productive of great mischief; and if this occur at the water-line, the vessel must founder, as may be inferred from the effect of bomb No. 8."

Respecting the use of this kind of ordnance in fortifications the commission were unanimously of the opinion that these guns are capable of prodigious effect in coast batteries, *as no ship of any force could possibly withstand such a fire* at 640 *guns or* 1,300 *yards;* that it will also be desirable to mount the new artillery on floating batteries, launches, gunboats, or steamers; and it is believed that the bomb cannon is well adapted to the defence of roads and coasts, the attack of ships in a calm, or on a lee shore," &c.

Moreover, the experiments which have been conducted by the Bureau of Ordnance and Hydrography of the United States navy, show that guns of this heavy calibre will carry further and truer, and penetrate deeper than 32-pounders; and, therefore, considering that the navies of the world are substituting these heavy guns, whenever they can, for the old 32-pounders, and considering that it is *ships*, and not sieges, that our fortifications are to be called upon to withstand, it appears to me it would be both prudent and judicious so to modify the plan of 1816 as to furnish our forts, as far as practicable, with heavy ordnance, all of the most effective and destructive kind.

Whether a ship's battery, throwing 10-inch solid shot, would not readily breach the walls of our strongest forts is worthy of inquiry. The concussion from such a broadside would be tremendous. It is true there are no ships at present that can throw such a broadside, yet it is thought practicable and desirable by navy officers to build such ships, and experiments have been made which leave no doubt that such ships will be built. Whether our ramparts on shore could withstand such ordnance is not for me to say. I therefore suggest the inquiry.

It is a curious fact that, as a general rule, the fire of large forts has always been proportionally less destructive than those mounting only a few guns, and having those in barbette, in open battery, either with or without breastworks.

This may be accounted for by the smoke; for wild firing applies not only to

the guns of a fort, mounted in casemates, but also to the guns of double-decked ships.

A single broadside from the gun-deck of a man-of-war will so fill her between decks with smoke as to render the object at which she is firing invisible, and consequently, unless she will wait for her own smoke to clear off, which requires some time, the rest of her firing, as all sea fights prove, is without aim, very much by guess, and therefore to little purpose.

The same is the case with guns fired from casemates of forts on shore, for in no other way can we account for the random firing; the very shots, in proportion to the whole number cast, that tell in the engagements of double-decked ships and casemated forts.

Two frigates or two seventy-fours will engage each other within pistol shot, or a fleet will attack a fort, and when we come to count the shot that have been fired, and to compare those that have told with those that have been thrown away, and then recollect the size of the target, we are astonished.

In the action between the Constitution and the Guerriere, which lasted for about half an hour, the two ships being within pistol shot, the former sufferred "very little in her hull, and lost but seven men."*

In the fight between the United States and Macedonian, the two ships were at close quarters for one hour. The former had five men killed. "The United States," says the same authority, "suffered surprisingly little, considering the length of the cannonade."

In the case of the Constitution and the Java, the action lasted two hours. The Constitution lost nine men, and only "received a few round shot in her hull." Perhaps in this time the Java did not fire less than two thousand shot, and fifty of them, well placed in the hull of her antagonist, would have sunk her.

The Hornet and the Peacock were single-decked ships; their smoke would clear, and the Hornet could see to take aim. In less than *fifteen minutes she sunk her antagonist.*

In the battle of the Nile, where seventy-fours were principally engaged, and they in smooth water at anchor, and close, too, lasted through a part of three days. (No firing here like the Hornet's, though her target was so small in comparison. The secret is, she fired with aim; they, blinded in smoke, without.)

The action between the Wasp and the Frolic, also single-decked vessels, lasted forty-three minutes, in which time the killed and wounded aboard the Frolic amounted to between ninety and one hundred. These small vessels are more unsteady in a sea-way than large ones; they do not offer so large a target, and yet their fire is so destructive. How else is it to be accounted for?

In the battle of Trafalgar, which was of long duration, and mostly between ships-of-the line, the loss was only about six men to every ten guns engaged, not one-tenth part of what it was in the action of the Wasp.

The use that I intend to make of these facts may be objected to, on the ground that I deduce a principle from the sea and apply it to the land, viz: that, because at sea, guns fired in the open air are much more destructive than those about which the decks confine the smoke, it does not follow that guns, when served from behind sand bags or mud banks on shore, are more destructive than they would be if served in casemates, by a crew blinded with smoke. I will quote cases directly in point: our army in Mexico, with guns behind sand bags, battered down the walls of Vera Cruz, and lost only some half dozen men in the siege.

At the battle of Fuenterabia, in 1836, the town, with two guns of small calibre behind an old wall, and a third of large calibre, which was added on the evening

* Cooper's Naval History.

of the attack, was successfully defended for a whole day from a combined attack of British and Spaniards, in six armed steamers and a number of gunboats.*

Then there was the famous case of the Martello tower, in the bay of Martello, in Corsica; one heavy gun, on the *top* of a tower, beat off in 1794 "*one or two British ships-of-war*, without sustaining any material injury from their fires."

"This circumstance," says Colonel Pasley, in his rules for conducting the practical operations of a siege, "ought merely to have proved the superiority which guns on shore must always, in certain situations, possess over those of shipping, *no matter whether the former are mounted on a tower or not*."

This is quoted with approbation by Colonel Totten, in his celebrated report of 1840, as an example of the superiority of forts over ships. But it appears to me only to prove and beautifully to illustrate the superiority of one gun, so mounted that it can fire *with aim*, over many guns that are enveloped in smoke, and fired without aim.

But if this Martello case affords grounds really for the "just decision" claimed by these two distinguished military authorities, then why have any forts at all? Why should our army engineers advocate so elaborately in 1836, and with so much ingenuity in 1840, the continuance of the system of 1816, if one gun on shore, "whether mounted on a tower or not," can and ought to beat off "one or two British ships-of-war?" May I not, therefore, in proposing to reply, in part, upon open batteries on the shore for coast defence, urge the modification as a thing proved by actual experiment, and, by legitimate conclusion, quote in favor of such modification the opinion of our most distinguished engineers? We can never expect our works on the seashore to have anything stronger to resist than "British ships-of-war;" and if one gun, in open battery on the shore, "whether mounted on a tower or not," be superior to "one or two" of those ships, surely our seaport towns of second and third rate importance may safely rely upon open batteries on the beach to protect them from "British" or any other "men-of-war."

Colonel Jones, another authority of equal weight in military matters, quotes Nelson's attack upon Copenhagen, Sir John Duckworth's daring passage of the Dardanelles, the attack at Acre in 1840, and Lord Exmouth's cannonade of Algiers, as cases which lead to the supposition that land batteries cannot resist an attack by fleets. The Queen Charlotte, bearing Lord Exmouth's flag, being brought within fifty yards of the Mole, at Algiers, "poured such an irresistible fire on the works around," says Colonel Jones, "as to silence every *gun*, and was ultimately compelled to withdraw, with the loss of only eight men killed and one hundred and thirty-one wounded."

The sides of a ship are of wood; it is combustible, the walls of a fort are not: and on board ships in a fight it is the splinters that do the mischief. One gun, even in open battery on the shore, has greatly the advantage of one gun on board ship. The former can take better aim, has nothing to fear from splinters, and presents a very small target; whereas it has the whole ship, with all its vulnerability for a target. But as to the superiority of ships over forts, it appears to me there is scarcely room for the question; each in its own sphere is superior to the other.

And that the Queen Charlotte should silence the mole battery, is to be accounted for upon the principle of firing with and without aim. She was within fifty yards of it; it therefore occupied nearly or quite one-half of her horizon, and she *could not miss it*, it was so large. In comparison to the fort she was a small target, and it required some attention to aim to hit her; but the smoke on both sides prevented this.

Therefore, supposing that in the attacks of ships against forts, the guns on each side be served with equal bravery, the question of superiority resolves

* Colonel Totten's Report on National Defence, 1840, Doc. No. 206, page 16.

itself almost entirely into a question of marksmanship. A shot that is fired without aim is generally a shot thrown away,

Nevertheless, the gallant colonel very properly cautions the "engineer charged with the defences of maintaining a fortress, so to arrange his batteries that the defence may be from several points distant from each other, armed with fifty-six pounders as the lowest calibre."

The system of 1816, according to the report of the board of army officers in 1840, does not contemplate a single gun heavier than a forty-two pounder, or an eight-inch howitzer. It contemplates mortars, but mortars against ships and random shots.

Previous to the attack of the junk ships in 1782, Gibraltar resisted a bombardment for two years.*

In 1789, Admiral Rodney threw into Havre de Grace 19,000 heavy shells, and 1,150 careasses, in fifty-two hours, "to destroy a few boats."†

In 1792, the Duke of Saxe Tessehen threw into Lille, in one hundred and forty hours, "without effect, 30,000 hot shot and six hundred shells."‡

In 1795, Pichegree threw 3,000 shells into Manheim, and 5,000 into the Fort of the Rhine.§

In 1807, at Copenhagen, in three days of partial heavy firing, 6,412 shells, besides careasses were thrown.‖ All these were thrown to no purpose.

At Fort Browne, on the Rio Grande, our men dodged the shells thrown by the Mexicans from Matamoras.

At Fort McHenry "the bomb bursting in air" furnished the poet with a stanzas; they produced no other effect.

Bonaparte's opinion of them may be learned from the instructions which he caused to be issued to the governors of besieged towns.

"Quant aux effets des bombes, et des autres projectiles incendiaires, nous examinerons plus tard, les moyens de les diminuer; mais nous observerons dés ce moment, qu'ils n'ont jamais contraint une place, bien défendue àse rendre. Les anciens sièges, en offrent la preuve; et les examples tout reèns de Lille, de Theonville, et de Mayence, la confoiment."

Therefore let us modify the system, so far as most of the mortars and all the 6,309 pieces of ordnance, from a twelve up to a long forty-two pounder, required by the plan of 1816, are concerned, and substitute for them the heavy calibres of the present day—the nine, ten, and eleven-inch solid shot and shell guns.

Taking the Martello tower for our guide, let us also, instead of building forts of the second and third class, contemplated in the system of 1816, send to every town along the seaboard, that an enemy could reach in his ships, one or more heavy pieces, and plant them there in open battery upon the beach, for the defence of the place, "no matter whether they be mounted in a tower or not."

By a proper organization, easy to be effected and kept up without any draft upon the treasury whatever, except for powder and ball to practice, volunteer crews for these guns may be procured from the towns themselves. Well-trained officers of the army should be sent to instruct them. In such hands each gun so planted and served out in the open air, having an embankment or a few sandbags for protection, will be more than a match for "two British ships-of-war."

Sir Sidney Smith, whose dashing gallantry and skilful bravery have been so much admired, attacked and felt the force of one of these open batteries in 1806. He was in the Pompée, an eighty-gun ship, and accompanied by two frigates; he anchored about seven hundred yards from a battery of two guns, situated on the extremity of Cape Licosa.

"The line-of-battle-ship and frigates fired successive broadsides till their ammunition was nearly expended; the battery continually replying with a slow

* Sir J. T. Jones's Journal of Sieges in Spain, vol. II, page 374.
† Ibid. ‡ Ibid. § Ibid. ‖ Ibid.

but destructive effect. The Pompée, at which ship alone it directed its fire, had forty shot in her hull; her mizzentopmast carried away; a lieutenant, midshipman, and five men killed, and thirty men wounded. At length, force proving ineffectual, negotiation was resorted to, and after some hours' parley, the officer, a Corsican, and a relation of Napoleon, capitulated. It then appeared that the carriage of one of the two guns had failed on the second shot, and the gun had consequently been fired lying on the sill of the embrasure; so that, in fact, *the attack of an eighty-gun ship and two frigates had been resisted by a single piece of ordnance.*"*

Whatever Napoleon's cousin could do with a gun, our officers, our soldiers, and the yeoman of this country can do as well.

This turning out of the citizens to defend their town, with a gun in open battery, against the attack of ships-of-war, is no experiment with us. The thing has been handsomely, gallantly, and successfully done.

"The affair of Stonington," says General Totten in his report of 1840, "during the last war, affords another instance of successful defences by a battery. In this case there were only two guns (eighteen pounders) in a battery which was only three feet high, and with embrasures. The battery *being manned exclusively by citizen volunteers* from the town, repelled a persevering attack of a sloop-of-war, causing serious loss and danger, but suffering none."

In the war of 1828, between Peru and Columbia, I was serving on the Pacific station. Admiral Guise, a dashing officer and brave Scotchman, attacked the city of Guayaquil with the Peruvian squadron, which consisted of a frigate, a sloop-of-war, and several brigs and schooners. The approaches to the city were undefended. He took up his position without molestation within musket shot of it and commenced his fire.

Under cover of the dark the besieged threw up an embankment, and planting two or three field-pieces behind it opened a fire upon the ships at daylight, killed the admiral, and beat off his squadron.

The annals of war, the written arguments of the most distinguished officers of the engineer corps, and the facts which I shall state, afford, to my judgment and reason, ample grounds for the position which I maintain as to the dispensing with fortifications, in a large majority of cases, along the seaboard; and of substituting therefor a few pieces of this new, heavy, and destructive ordnance, without the protection of any mason work whatever. If these facts, annals, and arguments do not impress conviction upon your mind as strongly as they do upon mine, it is not because of their insufficiency—but because, in attempting to apply and illustrate them, I have obscured their bearing and weakened their force.

"The fortifications of the coast," says the board of army officers, whose able report of 1840 quieted the public mind, and fastened for ten years longer upon the country the effete system of 1816; "The fortifications of the coast," say they, "*must* be competent to the double task of interdicting the passage of ships and resisting land attacks—*two distinct and independent qualities.* The first *demands merely an array in suitable numbers and in proper proportions of heavy guns, covered by parapets, proof against shot and shells.*"†

Now I propose to show that the railroads and the means of locomotion in this country sufficiently defend our fortifications from land attacks; and that consequently the principal *requisite* henceforward in a system of fortifications for the coast, is merely an array in suitable numbers and in proper proportions of heavy guns along the beach to cover the approaches of ships from sea to seaport towns.

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*Journal of Sieges.—Colonel Jones.

†Page 41, Doc. 206, House Rep., 1st session 26th Congress.

To support the propositions taken by General Totten in favor of the system of 1816, both in his report of 1840 and 1836, there was a table in the latter estimating the number of men that, according to the census of 1830, could be concentrated in Boston, Newport, New York, Philadelphia, Norfolk, Baltimore, Charleston, Savannah, and New Orleans in eleven days.

This table was made the basis of important deductions in favor of the present system; and as the state of things now is so entirely different from what it was then, I quote the table in order to show that the changes which have taken place in our means of concentrating and moving forces in war leave abundant room for many modifications in the old system of 1816.

TABLE F.*

Exhibiting the amount of militia force that may be concentrated at Boston, Newport, New York, Philadelphia, Norfolk, Baltimore, Charleston, Savannah, and New Orleans successively, from the first to the eleventh day; each day's march being computed at fifteen miles—founded on the census of 1830.

Days.	Boston.	Newport, R. I.	New York.	Philadelphia.	Norfolk.	Baltimore.	Charleston.	Savannah.	New Orleans.
1	5,422	1,397	20,218	26,132	1,864	10,046	2,513	1,173	3,032
2	28,351	2,373	28,131	26,521	2,880	18,042	7,160	3,960	7,836
3	34,138	12,340	44,123	35,450	4,416	21,266	9,475	5,948	8,716
4	39,561	17,143	57,925	69,100	7,608	27,916	14,601	6,588	12,499
5	49,127	33,221	59,478	70,608	11,101	31,297	18,443	9,263	14,474
6	59,893	42,807	81,252	127,666	14,511	49,648	22,490	19,725	17,339
7	81,867	61,335	104,180	154,036	20,699	65,382	24,393	21,903	17,906
8	97,697	65,583	137,048	167,703	28,039	77,543	29,416	25,220	22,561
9	111,655	83,111	152,841	195,265	32,562	78,164	40,835	36,630	26,433
10	125,326	109,268	164,116	219,983	36,446	87,520	45,582	41,345	28,140
11	144,076	130,824	191,353	221,603	45,549	101,970	59,701	60,422	31,647

This possible concentration of forces, which it required eleven days to make in 1836, may be now doubled and trebled, and made in as many hours; surely, therefore, this process of concentration—this immense artificial military aid which steam and electricity now afford, and which was not anticipated nor counted upon in 1816, when the foundations of the system were laid; surely they, by protecting our forts against sieges, call for modifications and suggest changes which it would be wise to consider and prudent to make.

In this country, more than in any other, the genius of free institutions compels the government to keep pace with the improvement of the age. The people do it, and they are the government. But in military establishments there is evidently a disposition to lag behind.

"In 1708 Marshal Boufflers, by authority from the King, given on the advice of the most experienced generals of that warlike age, ceded the strongest fortress in France to Prince Eugene and the Duke of Marlborough, to avoid the risk of the breaches being carried by storm; and in those days the superiority of the assailants was never doubted. The art of attack has since that period received various improvements, and the art of defence remains the same."†

The edition from which I quote was published in 1846—the work is one of acknowledged authority among military men—and according to it, it would be better to give our forts away than actually to subject them to a siege. Neither Vera Cruz nor any other fort in Mexico could withstand a siege from us. How important therefore is it that we should introduce in our system of coast defences

* Page 71, Doc. 293, first session twenty-fourth Congress.

† See Journal of Sieges in Spain, vol. 2, page 336.

some of the "various improvements" which the art of attack has received since 1708, and of which the art of defence has received so few! That instead of fighting ships from batteries of old-fashioned carronades, long twelves, eighteens, and twenty-fours; instead of the old-fashioned mortars, which Napoleon put his seal against, let us have in our forts the improved shell guns and heavy ordnance of the present day, which will plant shot and shell where they are aimed, and carry destruction to a distance which not a gun with which our forts (according to the list by the army board in 1840) are to be furnished can ever reach.

I am permitted by Commodore Warrington to quote from experiments which he has caused to be made in naval gunnery at the Washington navy yard.

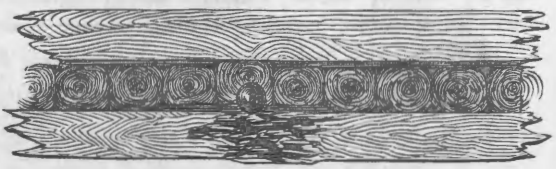
These experiments are going on there daily; any one who pleases may witness them. I cite from them to illustrate the position I maintain as to the destructive powers of this new and heavy ordnance, the accuracy of its fire, &c.

The figures are copied from the note-book of Lieutenant Dahlgren, United States navy, the officer who conducts the experiments.

The target is built of one upright and two horizontal layers of stout oak logs, bolted and fastened together in the most substantial manner. It is two and a half feet thick. These experiments were not conducted to represent the effects of this heavy ordnance upon forts and their walls, but upon wooden walls and the sides of ships. Therefore shells were used in the eight and nine-inch pieces to contrast their range and probable effect with the range and probable effect of a solid 32-pound shot.

The charge of powder used with the 32-pound shot was twenty-eight per cent. of its weight. The charge used with the two shells was only about thirteen per cent. of their weight, or, in proportion, not half as much as that used with the solid shot. Figures 1, 2, and 3 exhibit a horizontal section of the target, made to show the penetration of the shot.

Fig. 1.



8-inch shell, seven pounds of powder.

The penetration of the 8-inch shell was the least. It was unloaded. Had it been charged it would have been lodged in the best place; for, exploding in the middle of the target built to represent the side of a man-of-war, it would have torn it to pieces.

Figure 2 is the 32-pound shot. The hole that it leaves behind it is so filled up with splinters that a common knitting-needle cannot be thrust in after it. Such a shot as figure 2 would do no serious hurt to a ship's side.

Fig. 2.

32-pounder shot, nine pounds of powder.

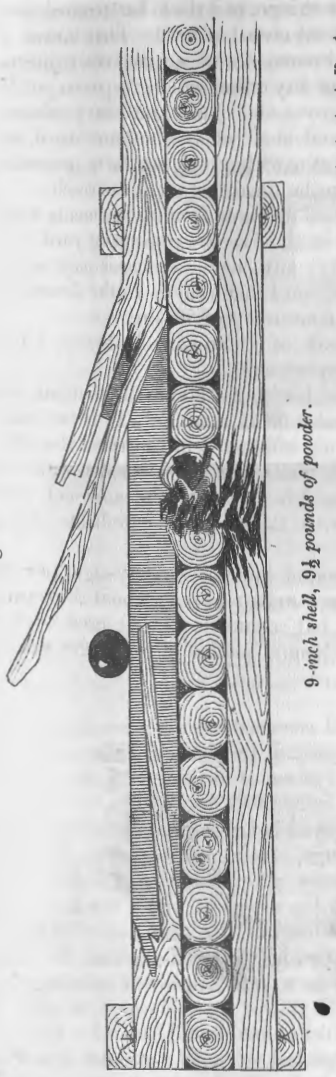


Fig. 3.

9-inch shell, 9½ pounds of powder.

Figure 3 is the 9-inch shell. Here the shot went through and dropped down on the other side of the target, as shown in the drawing. It tore off the logs and scattered the splinters in the most frightful manner. Much more would it have gone through had the shot been solid instead of hollow, and had it been fired with a full instead of a very reduced charge of powder.

These big hollow shot, and the bigger the better, are the things for our forts to use against ships; whereas it is the big solid shot that ships want to use against forts, for shells, after striking, are apt to explode without penetrating or breaking a stone wall.

Figure 4 illustrates a common example of target firing in the open air. This target is not one-fourth the size of that presented by the cross section of a frigate. One nine or ten-inch shell lodged in the ship's bows as she approaches, and exploding, would probably sink or destroy her. Neither of the two gentlemen named on figure 4 (whose balls were so well planted) ever saw a shotted gun fired before. They pointed and aimed it themselves; and it is a fair example of what an unpracticed eye may do with a gun when planted where it may be fired with aim.

Certainly we have nothing like invasion by sea to fear from any nation on this side of the water, and it is hardly probable that any of the crowned heads on the other side would have the hardihood to send into this country invading armies from beyond the sea. The very air we breathe protects us from any such liability. It is *free air*. Our republican institutions are dangerous to kings; and, in the minds of the kings, the effect of these institutions upon the soldiers of royal armies is far more dreadful than would be the system of 1816, with all its panoply of big forts and great guns.

It is, therefore, that our forts should be constructed and armed almost exclusively for resisting and repeling the attack of ships.

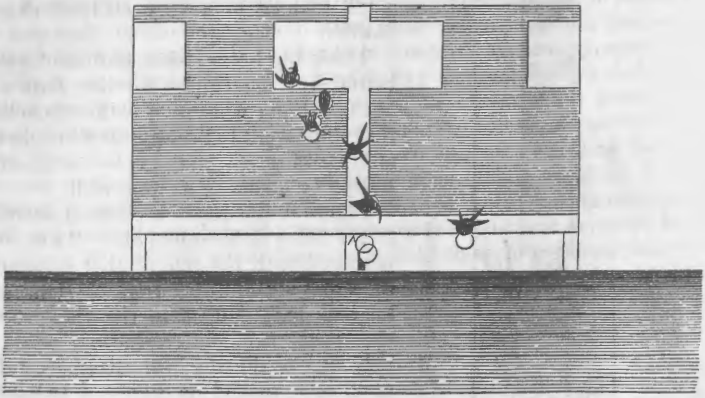
According to the Paixhan experiments and the opinion of the French officer, one or two shot from an eight-inch gun lodged in the side of a seventy-four would disable her. What would be the effect, therefore, of one or two, twice as large, from a ten-inch gun, striking a frigate or a steamer?

In turn, and per contra, suppose the battery of this heavy ordnance intended to keep ships off from all our towns, except the principal cities, to be planted on the beach without any parapet. The target that one of these guns and its crew would expose to the ship is very small, and when we consider the English mode of firing, and their sea fights, it would not be one shot in a hundred that, being fired from a ship, would strike such a target; her own smoke would conceal it from her. It affords no surface for splinters which do the mischief. So that

unless the shot would strike the gun or its carriage, and there is no necessity of having them as exposed as in this hypothetical case I have represented them to be, a shot from the ship might pass, even among the men, without its striking any of them, and consequently without doing any mischief.

Fig. 4.

Experimental battery. Practice with 9-inch shell guns, January 2, 1851.



Screen, 550 *yards*. *Shell*, 73 *pounds*. *Charges*, 9½ *pounds*.

Present: Hon. Mr. Stanton (chairman) and Hon. Mr. White, (member,) of the Naval Committee of the House of Representatives. Some of the shot were fired by these gentlemen. The lower shells were fired with the quadrant, (54'.) the upper by the sights alone.

On account of the above recited facts and circumstances, on account of the considerations and reasons which they suggest, I propose, in answer to your first question, modifications to our present system of fortifications, &c., in the following particulars, to wit:

1st. That inasmuch as the new and improved heavy ordnance for throwing shot, both hollow and solid, has a longer range, gives greater accuracy, and is far more destructive than most of the ordnance with which our forts are now furnished, or than that by which, according to the report of 1840, it is intended to furnish them; therefore, I recommend that most of this ordnance of inferior range, penetration, accuracy, and destructiveness, be disposed of; that the supplies of more be discontinued; and that the new and improved ordnance be substituted in its stead.

I would not recommend that any of the old ordnance should be sold or melted down until the supplies of the new are completed, or nearly so, for occasion may arise, before we can be completely furnished with the new, when the old would be of great service.

2d. That no further expenses be incurred for preparing our fortifications along the Atlantic seaboard, to withstand *sieges* by *land*.

3d. That none of the works (except those in Portsmouth harbor) proposed in the army report of 1840,* table D, "*as works to be first commenced*," nor in table E, as "works to be commenced next after those in D;" nor in table F, as "works to be last commenced," be commenced at all.

4th. That for the protection of the towns, villages, and landings, therein to be provided for, one or more pieces, according to the condition of the place, of the most effective ordnance, be planted at suitable points behind simple embankments or earthen parapets.

* See page 74–7, Doc. No 206, House Rep., 1st session.

The carriages of the guns so mounted should be constructed with the view of easy transportation from one point to another along the shores of the harbor to be defended; so that on rails, paved or plank roads built for the purpose, these pieces might in fact constitute a locomotive battery along the beach, and not leave it, as all shore-batteries have done, entirely optional with the assailants to choose position. As far as the defences of the town against ships are concerned, this improved ordnance may thus be converted into a sort of "flying artillery."

5th. Instead of supporting garrisons at the public expense, in times of peace, for the care and management of these guns, it is proposed that they and their munitions, properly secured, be given in charge of the State, or of the authorities of the place to be defended; first taking such legislative steps in the matter as will induce the formation of one or more volunteer artillery companies at such place for the purpose of exercising the guns, learning the practice, keeping them in order, and ready for use, &c.

Officers of the army should be detailed to instruct the volunteers thus offering, in the great gun exercise; to examine and report upon the state of these companies and batteries, and keep the government informed, at all times, as to the efficiency and condition of each.

The whole seaboard defences of this kind should be classed in divisions, each in charge of an artillery, or engineer or ordnance officer of rank, with a proper staff.

The headquarters of each division should be the principal place in it, as at Old Point for one, New York for another, Charleston, Savannah, New Orleans, &c., for others. Each of these places should be provided with the means of great gun exercise, including a field of practice, targets, the kind of roads for manœuvring this kind of ordnance, &c.

The commander of each division should have authority to invite, annually, or as often as necessary, these volunteer artillery companies, or the best disciplined of them, to visit his headquarters and exercise in the practicing field, at target firing, &c.; the government paying the expenses of the trip, by allowing so much mileage, and so much per day during the visit.

We see our volunteer companies now are continually in the habit of visiting distant towns and villages, as a body, in their military capacity, and at their own expense. The practicing and the exercise with such terrible pieces would draw together a large concourse of people. This would give éclat, and the presentation of a sword, or some other reward for the best shot, would invest this feature of the modified system of defence with much animation, and infuse into these volunteer artillery men a spirit, a nerve, and skill which, in the day of battle, would make their pieces as firm as "Bragg's battery," and far more terrible and destructive than they would be if casemated in stone walls and enveloped all the time with their own smoke.

So far my remarks, in reply to your first question, relate to the defences of the Atlantic seaboard only. I proceed now to consider how far, and to what extent, the system of 1816 may be modified with regard to the defences of our Gulf and Pacific coasts.

I will speak first of the defences for the Gulf of Mexico.

We have seen that the system of 1816, as extravagant as it is, was never intended, in the mind even of its strongest advocates, to provide fortifications for *every* port, harbor, and anchorage along the seaboard in which an enemy might find shelter, take refuge, or form rendezvous in time of war.

Fortress Monroe would not prevent an enemy from entering the Chesapeake bay, nor hinder him from anchoring safely with his fleet at Tangier island, nor at the mouth of the Rappahannock, the York, or the Potomac river, nor at any one of the numerous safe and commodious anchorages that are to be found above Old Point. As far as any permanent fortifications that it is possible to erect at Fortress Monroe and the Rip Raps are concerned, an enemy might select any

one of the above-named places as a rendezvous for his fleet, and make that his centre of operations against the whole bay coast, the rivers and towns along it, and carry on his depredating and marauding expeditions with just as much impunity as though no such fortress had been built.

It protects Norfolk and the navy yard from a fleet, but it does not prevent that same fleet from running up to York river, or the Rappahannock, or the Potomac, or up the bay, nor does it prevent it from landing an army at any one of these places, and marching it off against Richmond, Fredericksburg, Washington, or Baltimore. The railroad and telegraph do that.

The circumstances that such a fortress as Monroe, with an important navy yard under its cover, is between his fleet and the sea, might somewhat cramp or embarrass such an enemy in his operations is admitted, but it would not, therefore, prevent them, for if his naval forces in the bay were superior to our own, he would command the bay in spite of the fort.

Even if the Chesapeake bay was lined with works from head to mouth, and on both sides, such a chain of military posts, however strong and costly, could not prevent an enemy from entering the bay with his fleet, and safely riding upon its broad bosom, out of the reach of their guns. He might still make it the centre of his operations; most of the time the anchorage is safe in any part of the bay; these forts would be immovable; they could not go after him; and at most, they would only prevent him from selecting the most convenient places for shelter, and the best points from which to operate. That is all.

The same is the case in the Gulf of Mexico. For eight or nine months in the year vessels may ride in safety at anchor off the shore, anywhere between Pensacola and Galveston. The land there forms a lee, and affords a shelter from the northers. From two to twenty miles from the land, and in depth varying from three or four to twenty-five or thirty fathoms, the anchorage is good.

Now, if we rely upon fortifications to protect that coast, it will be observed, the whole Gulf front might be lined with them, and still they would be harmless against a fleet with its powers of locomotion. It could string itself at anchor along the coast, in sight of the very works built for defending it; and if our reliance were upon them, it might capture or dam up in stagnant ruin, all the commerce of the Mississippi valley. In the Gulf, as well as in the Chesapeake, and in our own waters generally, we must have the naval supremacy. In any plan of providing for the national defences that is an essential feature, and it ought to be *sine qua non* with Congress.

The plan, therefore, of providing permanent fortifications for the Gulf, seems to be this: that we should select a few of the points which would be most important for us as places of refuge and rendezvous, and which, if occupied by an enemy in war, would enable him the most to annoy us, and fortify them.

These points are Key West and the Tortugas, and perhaps Ship and Cat islands. In a commercial and military sense, the Gulf of Mexico and the Caribbean Sea are but an expansion of the Mississippi and Amazon rivers. In this view of the subject, the mouth of the Mississippi is not at the Balize, nor that of the Amazon at Paia; they are both in the Florida pass, between Key West and Cuba.

For one-half the year there is a sort of monsoon in the Gulf of Mexico; during this period the winds are from the southeast; at this season, therefore, the winds and the currents in the Yucatan pass are such as to prevent the passage that way of vessels from the Gulf.

Moreover, the island of Jamaica, where the English have a naval station, overlooks the Yucatan pass. When the northeast winds prevail the Yucatan pass is open to sailing vessels; but a few steamers, with Jamaica as the centre of operations, would close it to our commerce.

When the southeast winds prevail, the route of a sailing vessel bound from the Gulf to Jamaica, is not through the straits of Yucatan; it is through the

Florida Pass by Key West, and then back on the south side of Cuba. Now a maritime enemy seizing upon Key West and the Tortugas could land a few heavy guns from his ship and make it difficult for us to dislodge him. Here railroads and the telegraph do not reach, and as long as he should hold that position, so long would he control the commercial mouth of the great Mississippi valley.

In that position he would shut up in the Gulf whatever force inferior to his own we might have there. He would prevent re-enforcements, sent to relieve it from Boston, New York, and Norfolk, from entering the Gulf. Indeed, in a war with England, the Tortugas and Key West being in her possession, it might be more advisable, instead of sending from our Atlantic dock yards a fleet to the Gulf, to send it over to the British islands and sound the Irish people as to throwing off allegiance.

This country is too rich and powerful to confine itself to a system of national defences which looks to a passive state for it in any war. It cannot content itself by waiting for the enemy to come, that we may simply beat him off from our shores. Neither is it sufficient for it to have the ability to send out a few cruisers and armed privateers to prey upon the commerce of an enemy.

We have seen its free institutions, by their silent operations in times of peace, shaking the thrones of Europe, and causing the crowned heads that sit upon them to tremble. In time of war it must have the ability to re-enforce that influence with its strong "right arm." The sensibilities of the people everywhere are alive to that influence—their sympathies are so strongly with us, that should it become necessary to carry war into any of the maritime States of christendom, the American legions would be regarded by the masses as friends and deliverers, not as enemies.

Therefore, instead of being content with the capture of a few men-of-war and unoffending merchantmen for prizes, we want a system of defences which shall enable us to send naval expeditions against the enemy's country, invite and assist the down-trodden millions to throw off the hateful yoke, to break their bonds asunder, and to stand up as freemen, like ourselves.

In an expedition upon Jamaica, Key West being in the hands of the enemy, it would be difficult for our Gulf and Atlantic forces to unite.

Therefore the works at Key West and the Tortugas should be provided with shell-guns of the most destructive calibre, and their walls should be substantial enough to resist the concussion of a man-of-war broadside. They are wanted to give protection to our fleeing merchantmen, to afford a refuge to our fleets until time and opportunity and circumstances serve for striking the blow, or making a move. They are wanted by us, because they would be so immensely valuable to an enemy.

The railroads that will be in operation from Pensacola and Mobile soon, and probably before any additional fortifications can be erected there, will secure these places from invasion and seizure; and the works already there, with a few more guns in open battery along the beach, would effectually protect them from the great guns of ships. Still, an enemy with a fleet superior to the one we might have in the Gulf could anchor along the shore, as he can in the Chesapeake, and greatly harass our commerce there. No system of fortifications can prevent that.

In the next maritime war, (and in such a war we have nothing to fear from any quarter except one,) it is not upon the Atlantic, properly speaking, that the great sea-fight is to take place: it is in the Gulf of Mexico, or near the English shores.

Jamaica is an important naval station; it commands one entrance to the Gulf. There Great Britain can assemble her fleet, and within three days have it off the Balize, in position to strike a terrible blow at the commerce of that valley.

Shutting up the Florida Pass, she would have complete control of the Gulf· Norfolk and New York are inconveniently situated to defend it. Some years ago a man-of-war was sent with despatches from Norfolk to Pensacola; she was fifty-odd days in making the passage.

The means of defence for the Gulf should be within the valley that belongs to it. The resources of this valley are ample, its means most abundant, and its people are its best and most appropriate defenders. Pensacola should therefore be built up as a naval station, and the depot at Memphis fostered with care and solicitude. Instead of draining the treasury for forts, under the system of 1816, these two places should be put in condition for building, equipping, and fitting, upon a scale sufficient to secure to us, in war, the naval supremacy at least in the Gulf.

In a war with England, and with those two places as the centres of operations, it probably would be found desirable to move upon Jamaica and other British islands in that quarter. New York and the Atlantic dock yards would probably be the centre of other operations; and if Jamaica fall in such a war, it must fall under the guns and before the gallantry of the west—the east will have need and occupation for all its forces in other quarters.

Memphis is fast rising in importance as a place of construction. Private enterprise has already commenced to establish building-yards there; and in that teeming region there is no lack of naval and maritime resources. The ropewalk there is of no consequence. We want docks, storehouses, machine-shops, and founderies for casting, forging, making, and building anchors and cables, ships and engines; and for preparing and keeping in store, out of the excellent materials to be found in that valley, all the arms and munitions of war which would be required for the defence of the Gulf, the capture of Jamaica or any other British possession, if Britain be the enemy.

The affections of these islanders for the mother country cannot, in the nature of things, be as strong or as abiding as those of our citizens for their own homes; and therefore it may be imagined that an attempt by us to invade and get possession of these islands would be quite a different affair from an attempt, on her part, at invasion and conquest here. A tower of strength has this nation in the brave hearts and strong arms of its gallant yeomanry. Small indeed would be the degree of aid and comfort which a national enemy would derive from disloyalty and disaffection of American citizens.

I have, on former occasions, presented my views at large with regard to the importance of Memphis as a naval depot. These views are before the public, and therefore I deem it unnecessary to repeat them here. We have turned the corner, and are now going ahead in the peaceful race for the commercial supremacy of the seas; the next trial is to be for maritime supremacy of another sort. It is hoped that the day for that contest is far distant. But every people are liable to war; and it is a fact which we cannot blink, that, in providing for the contingency, our statesmen and warriors must, for many years to come, have an eye to the forces which Great Britain, rather than any other power, can bring against us. But let that contest come when it may, it is most likely to be decided in the Gulf of Mexico, and its twin basin, the Caribbean sea; they are the receptacles of all that the two grandest systems of river basins in the world will have to pour into the lap of commerce. The valley of the Mississippi on one side, and the valley of the Amazon on the other, will in time make these two arms of the sea the commercial centre of the world.

The mouth of the Amazon, the mouth of the Orinoco, and the mouth of the Magdalena, are, commercially speaking, almost as much in the Florida Pass as is the mouth of the Mississippi river. Such is the course of the currents, and such the direction of the winds in that part of the world, that a vessel sailing from the mouth of any one of these rivers for Rio de Janeiro, in Brazil, or for India, or for the markets of the Pacific around Cape Horn, or for Africa, or for

Europe, has first to steer to the northward and westward until she reaches the parallel of 25° or 30° north. This brings her off our own shores; and it is impossible for her to pursue any other route, so long as the northeast trade-winds prevail, or the great equatorial current which feeds the Gulf Stream continues to flow across the Atlantic. No vessel trading under canvas from the mouth of these rivers to the markets of South America, Europe, Asia, or Africa, can go any other way. They *must* pass by our doors.

Therefore, in planning a system of national defences, who can overestimate the importance of the Gulf of Mexico as a nucleus of naval means, the centre of naval operations? That centre is at Key West and the Tortugas; hence the great need of strong works there.

Interests of the most delicate, valuable, and, to an enemy, of the most attractive kind, are even now daily springing up, and expanding themselves out upon the waters and about the borders of the Gulf of Mexico and Caribbean sea—interests which, if they should be injured or put in needless jeopardy, will create a greater sensation throughout this country than would the landing of a hundred thousand men-at-arms upon our shores. These interests are maritime—they are American; their defences and protection are naval; they must be watched and guarded from the Mississippi valley. Memphis and Pensacola by nature are, by rights ought to be, and by legislation should be, the centres of operations in the case.

Panama, Nicaragua, and Tehuantep echave, or are about to impose new obligations upon us. We must look to them, and, in providing for the common defence, take them into consideration. They are links in the chain which binds the most remote corners of the republic together. They are the gateways between distant parts of the Union; and they must therefore be cared for in peace, guarded and protected in war.

The Amazonian basin, embracing an area more than twice the extent of our great Mississippi valley, fills too large a space in the world to escape attention from us, when we are in the very act of laying the foundations for a permanent system of national defence. With all the climates of India, with unheard of capacities of production, and the most boundless sources of wealth in the field, the forest, and the mine, that valley, so soon as it shall begin to feel the axe and the plough, will pour into our lap a commerce, the value of which is as limitless as are its own vast resources. Nature has placed us in the position to command that commerce. The great business of fetching and carrying there must be ours. For coming and for going, the winds are fair for us; and we are the only nation for whose shipping they are so fair.

That arm of the ocean which severs the continent nearly in twain, to make between the "Father of Waters," at the north, and the "King of Rivers," at the south, a receptacle for their commerce, is receiving from the Mississippi valley alone an amount of produce that astonishes the world. Yet the Mississippi valley is not half peopled up. What, therefore, will this oceanic basin, this commercial receptacle for the surplus produce of the two grandest systems of river basins on the face of the earth be, when the great Amazonian valley, of double area, with its everlasting summer and its endless round of harvests, comes to be subdued and brought into cultivation? What the Gulf of Mexico is now, is as nothing to what it is to be. It abounds with commercial elements that cannot be comprehended for their magnitude; and in proportion as it becomes the seat of maritime wealth and greatness, so, too, must it become the centre of naval strength and power. As Columbus lay sick, it was upon the waters of this sea-basin that the angel visited him in a dream, and told him that God had made his name great and sent him to "unbar the gates of ocean." The keys to these gates are at Key West and the Tortugas, Memphis and Pensacola. Nature has placed them among the wonderful resources of the great valley; and to stand as gatekeeper before them is the mission of those naval forces that naturally centre in the Gulf.

OF THE PACIFIC SEABOARD.

No American statesman will, I imagine, rest content with any plan of national defence which does not contemplate for us at least the naval supremacy in our own waters. That is the starting point—and that is the point which, in the erection of military works on the land, in the construction of floating batteries for our harbors, or in the building of ships and steamers for the sea, should be constantly kept in view. It is the true basis to work upon.

In a military point of view, California and Oregon are colonies. Far remote from the heart of the country and the strength of the nation, they are young and feeble, open to attack, and inviting to conquest. In war no relief can be sent them, however beset, unless at great risk and with an enormous expenditure of both time and money.

The voyage by sea from the Atlantic to the Pacific ports of the United States is the longest voyage in the world. Within the whole scope and range of commerce, there are no two shore-lines so remote from each other, in time, as these are.

The average passage of all the vessels which sailed from the Atlantic ports for California in 1850 was one hundred and eighty-seven days—six months. These vessels went singly, each making the best of her way without regard to the others. In a fleet, it is the dullest vessel which regulates the speed of all; the fastest must reduce canvas, yard, and stand along under easy sail, that the slow vessels may keep up.

Bound hence with a fleet for the relief of California, our ships would have to pass no less than three important naval stations, all belonging to the same power. One of them, St. Helena, is on the wayside; the two others, Bermuda and the Falkland Islands, are right in the middle of the road.

If the fleet should escape the vigilance and annoyance of the men-of-war stationed at those islands, there are still before it the storms of Cape Horn, the dangers of the sea, and the war of the elements for it to encounter and contend with.

Such would be the length of the voyage, and such the difficulties and the risks to be encountered by the way, that the practicability of sending succor to California around Cape Horn, in a war with England, may be considered out of the question.

Single ships might find their way in safety around, but as for a large fleet, covering as it goes miles in extent, and attracting the attention of the enemy with the multitude of its ships—escaping all the dangers that would beset it by the way—surely no one would count upon it, and it would be folly to expect it. California and Oregon must, therefore, rely upon the means of defence which can be sent forth from their own harbors in war; and the question is, how shall those means be provided in peace?

Shall the system of 1816, which has been tried and found too costly and defective for the Atlantic seaboard, be transferred to the Pacific, and engrafted upon its shores for another third of a century? Or shall the government resort to railroads, steam and the navy, and do for that country what has been found to answer so well for this?

The extent of our sea front on the Pacific, compared with our sea front on the Atlantic, is as eighteen to twenty-four; that is, the Pacific is three-fourths the extent of the Atlantic seaboard. To apply the system of 1816 to the former would, in my judgment, be injudicious as to policy, extravagant as to expenditure, and inadequate as to purpose; and therefore the system of 1816, excepting in so far as two or three works are concerned, should not be applied to the Pacific. We want no forts along that sea front, save only those that are nec-

sary to keep hostile ships, with their great guns, out of the reach of our cities, and to give protection to our dock yards.

There is not at this time a single dock yard upon the waters of the Pacific, belonging to any nation, at which even a frigate can be built and equipped. All the maritime powers are far removed, with their naval resources, from the eastern shores of that ocean. By establishing a dock yard there, and providing it with the means and facilities for repairing and equipping, we may, without difficulty, secure the naval supremacy upon that ocean; and once possessed, it will not be an easy matter for any power to wrest it from such hands.

The most desirable means of defence for those regions are such as we have on the Atlantic—a navy, steam, the railway and the locomotive, with their powers of concentration.

The characteristic feature which the improvements of the age have impressed upon military operations is mobility. To the degree with which armaments and armed forces are invested with locomotion and with celerity in movement, to that degree and in that ratio are they provided with the elements of power and destruction. It is its mobility, imparting toil in the field of battle, a sort of ubiquity, that makes flying artillery such a tremendous arm in modern warfare.

It is the swift foot of the armed steamer which has given her such tremendous force for battle that has appalled the most able sea captains, and left the military men of the world at variance as to the extent of her powers, so transcendent are they in the minds of all.

The part that railroads and magnetic telegraphs are to play in the great drama of war with this country has not yet been cast, much less enacted. In a military point of view, they convert whole States into compact and armed masses. They can convey forces from one section of the Union to another as quickly as re-enforcements can be marched from one part of an old-fashioned battle-field to another.

The money that is expended in the erection of a fort adds nothing to the national wealth, but the money that is spent in fortifying with railroads, while it gives the military strength required, vastly increases also the elements of national power, wealth, and greatness.

There have been expended by the States and people of the States, on this side of the Rocky mountains, about four hundred millions of dollars in building ten thousand miles of railroads and canals. These works have not only effectually provided for the common defence so far as invasion is concerned, but, besides reimbursing the projectors of them, in most cases, they have in all increased the value of the land in their vicinity, advanced trade and commerce, promoted the general welfare, and in the aggregate added not less than a thousand million of dollars to the gross sum of the national wealth.

The money that has been expended under the system of 1816 has added nothing to the value of the soil; it has afforded no facilities to commerce; it has not increased the national prosperity in any manner whatever; and, therefore, as to the alternative of providing for the defences of the Pacific coast by lining it with forts and castles, or by sending a railroad there and collecting naval means, it appears to me there is no choice, no need for deliberation, no necessity for argument.

The strongest work that stone and mortar can make, being erected at the mouth of the harbor of San Francisco, would not interrupt a blockade, nor prevent an enemy from starving California into terms. It is the navy alone that can do this; and vessels, with munitions of war sufficient for the purpose, should be placed under cover there now.

California does not produce breadstuffs enough for her own consumption, probably she never will. It is worthy of remark, that not one of our New England States, including New York, does that. Mining, commerce, and manu-

factures, rather than agriculture, will probably ever constitute the chief industrial pursuits of that distant State.

And until California has the means of deriving a support from the back country she must look for it to the sea; therefore an enemy, by taking up his position before the harbor of California in force sufficient to establish a rigid blockade, may, without striking a blow, starve the people into terms of surrender.

The greater the number of men in garrison, in such a case, and the larger the army sent there by us for its defence, the greater the distress; for the reason that they would the sooner eat out the substance of the land, and so assist the enemy in his work of starvation.

A railway to California would make that country as invulnerable and as secure from invasion as railroads have made the country on this side of the Rocky mountains; and with a railway a blockade would only annoy commerce, not starve the people.

In a consideration of the soundest policy this railway is called for. I have studied the subject, and the result of my best reflections with regard to it has led me to the opinion that the general government cannot too soon take the steps necessary and proper for procuring it to be built, and for collecting at the other end of it the nucleus of a navy, with powers of expansion sufficient to meet any probable emergency.

The vessels of our navy serving in the Pacific, instead of being brought home around Cape Horn for repairs, should be laid up in ordinary in California until sufficient numbers are gradually collected there to form this nucleus. The commerce of the country will supply the seamen for them whenever they shall be required.

My answer to your second question, viz: "What reliance could be placed on vessels-of-war, or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?" is, to a great extent, included in the answer just given to your first.

The defences upon which this country must and ought to rely are locomotive; therefore, to employ naval means to build floating batteries, which would have to be confined to the limits of the harbor, would be a waste of money, when we might, with that same money, give them wings or impart to them the breath of steam, and send them here and there wherever they would be of most avail.

The money which a floating battery would cost might keep a steamer afloat; which, with its powers of locomotion, might reduplicate itself, as it were, along the coast, by appearing successively before a number of places, and arriving at each place exactly at the right time. If the enemy would not come to the floating battery it would be of little use; but as for the steamer, if the enemy would not come to it, it could go to the enemy; it could select its own time, manner, and point of attack, and thus make up by activity, skill, and manœuvre, what it wants in strength.

The reliance to be placed on vessels of commerce for coast defences is casual and accidental; upon an emergency they might be armed and sent to sea to harass the commerce of the enemy; they might be used as transports or as fire-ships; or they might be sunk in channel-ways to block up entrances, &c., and to assist the works on shore to protect the towns. When wanted, they will be at hand; and in planning military expeditions, or preparing for defence, it is enough for our sea captains and great generals to know that the commercial marine—old hulks and new vessels—are among their means of attack and defence, and constitute an important part of the military resources which they hold in reserve—which are at all times available, and which, therefore, may be brought into play when required.

The report of the board of engineers of 1840 treats the subject of floating batteries at length. It shows conclusively that they are neither the most

efficient, effective, nor judicious shape into which the money voted for nationa defence may be put.

The arguments of the board upon this part of their subject appear to me conclusive; and, therefore, further remarks here with regard to floating batteries would be useless.

A prominent idea upon which the system of 1816 appears to have been founded is, that we as a naval power were to remain in hopeless inferiority; and hence the burden of the argument for a system of national defence has been "build stationary works—works that the enemy must come after; line the coasts with forts and castles to save the country from invasion, our women and children from the violence of enemies."

Railroads and steam have converted every village into a camp, every telegraph office into a watch-tower, on which is placed a sentinel more sleepless than Argus, for guarding and defending the coast from invasion. Steam, and railroads, and canals have connected every forest in the land into a timber shed for the navy, and our merchants and ship-builders have established scores of dock yards along the sea shore, and upon the banks of our rivers, at which keels may be laid and vessels launched and equipped with a rapidity that has never before been known in any age or country.

In 1836 General Cass, then Secretary of War, assumed the position, and General Jackson indorsed it,* *that for the defence of the coast the chief reliance should be on the navy; and that the system of* 1816 *(that of the board of engineers) comprises works which are unnecessarily large for the purposes which they have to fulfil.*

At that time steam navigation was a problem which had yet to be solved upon the ocean. Dr. Lardner had attempted it in the closet, and proved, as he said, that the conditions of the problem involved an impossibility. He therefore pronounced it an absurdity; and so men generally considered it. At that time railroads were much less complete, and far less numerous than they now are. The electric telegraph was also unknown.

Now the ocean is clouded with the smoke of sea steamers; the country is laced with lines of telegraph, and fretted with a network of railways—all tending to make reliance upon the navy still more exclusive, dependence upon the system of 1816 still more needless.

The board of engineers, to show how erroneous, in their judgment, this opinion of General Jackson was, supposed a case in 1836, and cited it again in 1840 as an illustration.

The case was well put; it produced a great effect upon the public mind; and as it is the hinge upon which the continuation of the present system was made to turn, I beg leave to quote the case now, that we may see how it will stand the test of the new condition of things; how the improvements that have since taken place will affect it, and how far it may be modified by the ground I have been endeavoring to make good.

"In the report," says the board of 1840,† presented by the engineer department in March, 1836, (Senate Document, 1st session 24th Congress, vol. 4, No. 293) "there is a *demonstration* of the actual economy that will result from an efficient system of sea-coast defence; which is to the following effect, referring to the document itself for detail.:

"There is first supposed to be an expedition of twenty thousand men at Bermuda or Halifax ready to fall upon the coast. This will make it necessary, if there be no fortifications, to have ready a force at least equal at each of the following points, namely: 1st, Portsmouth and navy yard; 2d, Boston and navy

* See page 5, No. 206 H. Doc., 1st session 26th Congress. See also page 1, No. 293 S. Doc., 1st session 24th Congress.

† Page 70, No. 206 H. Doc., 1st session 26th Congress.

yard; 3d, Narraganset roads; 4th, New York and navy yard; 5th, Philadelphia and navy yard; 6th, Baltimore; 7th, Norfolk and navy yard; 8th, Charleston, South Carolina; 9th, Savannah; and 10th, New Orleans, to say nothing of other important places.

"At each of these places, except the last, ten thousand men drawn from the interior, and kept under pay, will suffice, the vicinity being relied on to supply the remainder. At New Orleans, seventeen thousand men must be drawn from a distance. In a campaign of six months, the whole force will cost at least $26,750,000.

"The garrisons necessary to be kept under pay for the fortifications in these places will cost for the same time $8,430,500. The difference ($18,319,500) will then be only $3,448,150 less than the whole expense of building these defences, viz: $21,767,656; whence it follows that the expense of these erections would be nearly compensated by the saving they would cause in a single campaign."

This is the *demonstration*, first given in 1836, and repeated in 1840, to prove the very great economy and complete efficiency of the system of 1816; and in order to complete this demonstration, it was required that twenty-one millions of money and upwards should be first given to fortify only ten places along a sea front of two thousand five hundred* miles in extent; for there were "other important places," of which nothing was to be said.

Now let us suppose that, in conformity with the modifications which I have suggested, and according to the idea of maintaining such a system of national defence *that will secure to us the naval supremacy in our own waters*, a portion of this $8,430,500 which the plan of the board requires to keep for six months *only the "necessary* garrisons" in the powerful works which are supposed to be erected at each one of the ten threatened places. Let us suppose, I say, that, according to the proposed modifications of the system, a part of this eight and a half millions had been applied to the building of some twenty or twenty-five men-of-war steamers, such a force of steamers would be required, even under the system of the engineers, to serve as a coast guard in war, to brush from the *outside* of our harbors, which are protected on the *inside* by forts, any blockading ships that the enemy may station there, and to keep straggling cruisers from capturing and plundering our merchantmen in the sight of these same forts, and along our shores generally.

To keep up the proposed garrisons for one year at the ten threatened places *only*, would require, according to the estimate of the board of engineers themselves, $16,861,000.

The steamers will last many years; and according to the estimate of the navy board,† made at the same time, would cost, for the twenty-five, $5,625,000, or only about one-third of the actual cost of the garrisons for one year, after the forts were built at a cost of $21,767,656.‡

These twenty-five steamers would be stationed along the coast, and distributed, we may suppose, in the following manner, viz: two with their headquarters at Portsmouth, three at Boston, four at New York, two at Charleston, two at Pensacola, and two at the Balize.

The case put supposes it to be known that this expedition of twenty thousand men, who are about to invade a country of more than twenty millions, has rendezvoused at Halifax or Bermuda, suppose it to be at Halifax.

Two or three of these twenty-five smart, active steamers are sent to watch the enemy's movements. As soon as he puts to sea and takes his departure, one of them makes for the nearest post on our coast, and there delivers to the

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* See Engineer's (Col Totten's) Report, 1840.

†Page 83, No. 293, Senate Doc., 1st session 24th Congress.

‡Page 70, No. 293, Senate Doc., 1st session 24th Congress.

magnetic telegraph the intelligence that the enemy has put to sea, and is steering, with his expedition of twenty thousand strong, towards Charleston. The effect is electrical; instantly bodies of armed men heeding the summons would spring up, not from bush and brake, in a single glen, as at the sound of Roderick Dhu's whistle, but from every town and hamlet, mountain side and valley in the land. Harnessing up the iron war-horse, they would hold him, panting on the railway, ready at the word to speed off with them for the appointed place, at the rate of thirty, forty, or fifty miles the hour, according to the emergency.

In the meantime, and without confusion, message is sent by lightning for the look-out steamers and naval forces in the Gulf to proceed towards Savannah, and for those at the north to steer south and look into the Chesapeake for further orders. Or they may be directed to cross the enemy's hause and bring him to action, or cut off his stragglers, or otherwise harass and annoy him.

At the end of three or four days, or it may be a week or more, according to the weather, and the great variety of circumstances that tend to retard the movements of such a force at sea, another of the guarda costa steamers puts into the capes of the Delaware or elsewhere, with the certain intelligence that the enemy is bound for Charleston. Because his rate of sailing is regulated by the speed of the slowest vessel in the fleet, he is yet three days from Charleston at the least.

All our ships-of-war that have returned from cruises, that are just fitting out, or that may happen to be in port, together with the whole coast guard of twenty-five steamers which, at the commencement of the war, were found on hand, may thus appear off Charleston as soon as he: certainly they would be there before he could disembark. And should he be so infatuated as to attempt a landing, it would be practicable for us to have there, in force ready to receive him, an army, with a regiment even of *foot*, from every State in the Union, except perhaps California and Oregon.

Is it possible that an enemy could be tempted by any inducement whatever to land in such a country, provided with such means of defence, invested with such armed ubiquity, and such powers of concentration?

Fort Moultrie, which has beleagured an enemy before, and has demonstrated that it can hold a force from sea in check long enough at least for the lightning to go for help, and for steam to come with it, is there to beleaguer him again; and our coast fleet, which we have supposed to be assembled there as a witness to this hypothetical attempt at invasion, would be ready at the bar to receive this discomfited and crippled foe as he attempted to escape. Great would be the disappointment to the country if such a fleet should fail to give an account of such an enemy.

The present system of fortifications seems to have been planned upon the idea that in all wars this country was to stand on the *defensive*, and that all the energies of the enemy would be directed to siege and invasion.

But in the death struggle, what have we to fear from invasion? There is no pillar nor post in this country which, like the Paris of France, when it falls, carries the whole political edifice with it. There is no Paris in America. Unlike Europe, the armed occupation of a capital here would be no more than the occupation of any other town by an enemy; unlike Europe, there are no disaffected people in this country for a foe to tamper with. The government is by the people, for the people, and with the people. It is the people. And as for invasion, there would be neither danger to the country, nor its government, nor its institutions. Our free institutions are our best fortifications to protect the country from siege, and the land from invasion. Captivating the minds of his soldiers, the civil and political freedom enjoyed by all in these United States would convert the rank and file of an invading foe into friends. An enemy planting his foot upon our soil could at best hold no more of it than that upon which he actually stands and covers with his guns. If he attempted to move,

in whatever direction he should take up the line of march, the people in front he would find enemies, and those that he left behind, emboldened by his own deserters, would rise up in arms against him the moment his presence was withdrawn from them.

What attempts at invasion did England make during the last war? She was afraid of desertion and the propagandism of republican institutions then. It is true, she made a foray upon Washington, but found a precipitate retreat necessary, and that foray was as barren and empty of military result as a cloud without water. She attempted New Orleans, but there she encountered one of those sand-bag or cotton-bag forts, and her hosts fell before it.

In the war of 1812 we were young and feeble; England was at the summit of her power. The difference between the military condition of the two countries was immense; yet upon what point along the seaboard did she attempt invasion? Against what battery did she lay siege? If in the defenceless state of the country then—a country that had a navy to build, that had yet to plan its system of fortifications, to concentrate means of defence—if, under those circumstances, sieges were not laid nor invasion attempted at any point along an open sea front, with its indentations and windings of six thousand miles—if but with one-third of our present population—if with not one-tenth part of our present military resources, nor not the twentieth of our present powers of concentration, siege and invasion were not attempted then by a most haughty and proud foe, is it likely that in case of war now, when she looks upon us as her equal, and at least as her match in everything except in the number of "wooden walls"—is it probable or possible that, with such a power for an enemy now, anything like siege or invasion from the sea would be attempted or thought of?

With a home squadron comprised chiefly of steamers, it would be difficult to conceive how an enemy should so threaten as to make it necessary to establish a garrison of 17,000 or even 10,000 men for six months at Charleston or any one of the ten places named in the report.

The operations of these twenty-five steamers would be mostly confined to our own waters in war, for with want of depots of coal abroad they would be required to return into port at the end of every two or three weeks at least for a fresh supply of fuel.

Now bearing in mind my answer to your first question, and always supposing that one of the principal features in the system of national defence hereafter to be provided for this country is *naval supremacy for it in its own waters*, my answer to your second question is, with the modifications already proposed, that all *needful* "reliance" for *coast* defence can be placed on vessels-of-war and of commerce, upon open shore batteries, steam, railroads, and telegraph, OUR FREE INSTITUTIONS, and such like "substitutes for permanent fortifications."

In reply to your third and last question, as to the expediency of *continuing* the present system of fortifications on the shores of the northern lakes, I have to remark that, in my judgment, it is neither necessary nor expedient so to do.

As for *invasion* from that quarter, the difference in political condition between Canada and the United States is an ample fortification for us.

Large bodies of the people there now are known to be in favor either of separation from the mother country or of annexation to the United States.

An American army, therefore, going over into Canada in a war with England would be looked upon by a large number of the people there as friends and deliverers, not as enemies and oppressors.

The last war on the waters of the lakes was a war of ship-building.

He who could muster the strongest naval forces there—and there they had to be created—had the supremacy. And if, in case of war now, England should succeed in getting ahead of us with her naval forces on the lakes she could inflict great injury. A few days of uninterrupted control there by a few armed vessels, insignificant altogether as to absolute force, would make dreadful havoc

upon our lake shipping, our lake commerce, and our lake towns, if no precautions were taken to guard against it.

The commerce of the lakes will soon be worth to us as much or more than the commerce of the Atlantic.

During the season of lake navigation there is put afloat upon those waters every week, on the average, millions of American property, besides vessels and the lives of American citizens.

In no part of the world, except in the offings and harbors of the great commercial emporiums, is there to be found such a concentration of merchandise afloat. Nor is there, in case of our naval inferiority upon the lakes, any part of the world that affords such an abundant harvest of prizes to tempt the cupidity of seamen.

It is the policy of this country never to be the aggressor; it loves peace and hates war, and therefore it is not likely ever to be the party to strike the first blow in war. That is an advantage at which Great Britain generally aims, and that she fully understands and appreciates the importance of striking quickly upon the lakes in case of war with this country we have evidence conclusive.

Before she sent her minister plenipotentiary here with his ultimatum, when the friendly relations between the two countries a few years ago seemed to be so much in danger, she first assembled a fleet of fifty-odd sail in our waters, and upon our frontiers one-third of the whole British army, notwithstanding that she was at that time engaged in two distant and expensive foreign wars.

No one who, calling to mind those times, will examine her military journals of that day can fail to be impressed with the fact that her forces were especially arranged with a view to Canada and the lakes, and that there the first blow, or a blow synchronous with the first, was to be struck. Her intentions then were too manifest to be forgotten or disregarded even now.

It is true the war might commence during the season when the navigation of the lakes is annually closed, and when, consequently, all naval forces would be tied up. In that case we should have nothing to fear. But it might commence in the height of the commercial season; and the war might be commenced on her part by first admitting from the sea a fleet of small-class vessels, passing them up through the Canadian ship-canals into the lakes, and there letting the declaration of her intentions consist in an attack upon Buffalo, Chicago, and other lake towns with their shipping.

These interests are too valuable and important to be left at the mercy of an enemy even for a day. Therefore it would be advisable, so long as Canada is an English colony, to provide against a naval surprise on the lakes.

For this purpose it is only necessary to look to the means of assembling quickly a small naval force on the lakes, and, in the meantime, to place at the several cities and towns, and at the termini of the various railroads and canals along the lake shores, a few pieces of ordnance, according to the plan suggested for the towns generally along the Atlantic seaboard.

The forts which are already on the lakes need not be garrisoned in war only until we acquire the naval supremacy there.

We have canals and railroads by which we could send the frames of vessels and all requisite naval means to the lakes at short notice and in time to re-enforce what we might suddenly assemble there.

It seems, therefore, that, acting upon the policy of so shaping our system of national defence as to secure the naval supremacy in our own waters, we should proceed to build the engines, provide the armaments, and get out at the navy yards of Memphis and New York the frames of a few small men-of-war steamers for the lakes. The engines and the armaments might be placed upon the lake shores at once. The frames, on the first appearance of the war cloud, could be sent there by the Erie and the Michigan canals, put together, and be ready for launching at a moment's warning.

The Mediterranean is an inland sea, so are our lakes and rivers. Eminently continental in its proportions and maritime in its features, our country looks out upon blue water to the east, the south, and the west; the ocean front of the United States alone is greater in extent than the ocean front of the whole of Europe. Therefore, like action to the orator, a navy to us is the first, second, and third chief requisite to any effective system of national defence.

Respectfully, &c.,

M. F. MAURY,
Lieutenant United States Navy.

Hon. CHARLES M. CONRAD,
Secretary of War.

No. 7.

Report of Lieutenant J. A. Dahlgren.

ORDNANCE OFFICE, UNITED STATES NAVY YARD,
Washington, September, 1851.

SIR: I had the honor to receive a communication from the honorable Secretary of the Navy, enclosing certain queries from yourself in relation to the defences of the United States coast, with directions to "give to the subject my best reflections, and communicate the result to the Secretary of War." I have complied with the directions of the honorable Secretary of the Navy, as far as permitted by the limited time allowed for the purpose, and now beg leave, very respectfully, to lay before you such facts and opinions as have a bearing on the subject-matter of the queries proposed.

Query 1.—To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war, the invention or improvement of projectiles, or other changes that have taken place since it was adopted in the year 1816?

Shells projected horizontally from cannon are most destructive agents when used against shipping, but are not so efficacious against the masonry of regular works as shot, though in entering an embrasure and bursting they might do considerable mischief.

So far, therefore, as casemated batteries are concerned, shells have added very little to the power of ships; but against guns *en barbette* they will be found of material assistance, especially if charged with balls and used as shrapnel. And against open works, the concentration afforded by the well-served broadsides of one or more ships, should suffice to silence the works, if the vessels have no unusual disadvantages to encounter, and are brought within sure distance.

On the other hand, shells are exceedingly destructive to vessels if exploded in their sides; but as land works already possess, in shot, especially when heated, superabundant means for destroying ships that will expose themselves long enough to their fire, it may, on the whole, be deemed fairly doubtful whether, in a general view, the introduction of shells has materially altered the relations of fort and ship when opposed to each other.

If the question between them were merely the relative capacity, so far as attack and defence were concerned, there would be no difficulty in solving it. But in the great majority of cases, where the sea defences of the United States are concerned, the true question is in regard to the capacity of ships to endure the fire of forts *long* enough to pass them without so much injury as to interfere with the subsequent operations.

And it is on this account that the application of steam is to be considered as

materially affecting the power of forts. For whether it be used as a chief motive power or as an auxiliary, it gives great facility in concentrating and appearing suddenly on given points, and in assuring a certain and rapid transit when required to pass the fire of a fort.

In the defence of nearly every one of the large commercial cities, it will be observed that the chief reliance to prevent the approach of an enemy is by fortifying some approach to it; the naval question merely touches the practicability of *passing* the fire of these works, and not of sustaining it *any longer* than may be necessary in the most rapid movement that the ship is capable of.

To illustrate this practically let us turn to the mode proposed in the engineer's report* for excluding an enemy from the lower bay of New York by a fort on Sandy Hook, with floating batteries and bomb ketches inside.

The ordnance commonly mounted in the coast fortifications are 32-pounders, 42-pounders, and eight-inch howitzers. The effective fire of the 32-pounder can hardly be said to extend beyond a mile where heavy ships are concerned.

At that distance the penetration will not exceed fourteen inches when the shot strikes the surface fairly and directly. If the impact be oblique or on ricochet, the penetration is decreased accordingly. The effect of the fire is further decreased by the unavoidable deviation of shot at the distance of a mile, and by the movement of the object which is changing its position in direction and distance. It would be difficult to estimate correctly the number of shot which would have a maximum penetration under these circumstances, but perhaps not more than one in ten. The forty-two pounder and army eight-inch howitzer will not vary this capacity considerably, and it seems reasonable to assume that, if the distance be greater than a mile no material injury will be experienced from such pieces by a heavy ship when under way.

The sketch annexed represents the localities in question as given by the chart of the Coast Survey. The track at mean low water allowed to the heaviest steamers† is shown by the coloring.

The effective fire for the proposed fort as indicated by the circle, evidently covers no considerable part of the passage, and if a steamer chose to take the main channel she would, by keeping its extreme right, be under fire about six or seven minutes, and never approach the guns of the fort nearer than fourteen hundred yards, thus rendering the chances of any damage exceedingly slight. But the swash channel offers sufficient depth for her draught, and by using it the steamer would pass entirely out of reach of the fort. The sole reliance, then, to exclude the fleet becomes the floating batteries and bomb ketches; whether they may be trusted or not will be considered subsequently; the present object is merely to inquire if the fort has the power of itself to exclude shipping.

It seems evident, therefore, that while it is very doubtful whether forts have gained any advantage from the use of shells, it is certain their efficacy has been considerably diminished by the application of steam to the vessels-of-war, which by their decreased draught are enabled to enter channels not accessible to ships-of-the-line, and when obliged to pass the fire of permanent works are enabled to do so in so little time as hardly to afford the batteries an opportunity to effect any essential damage.

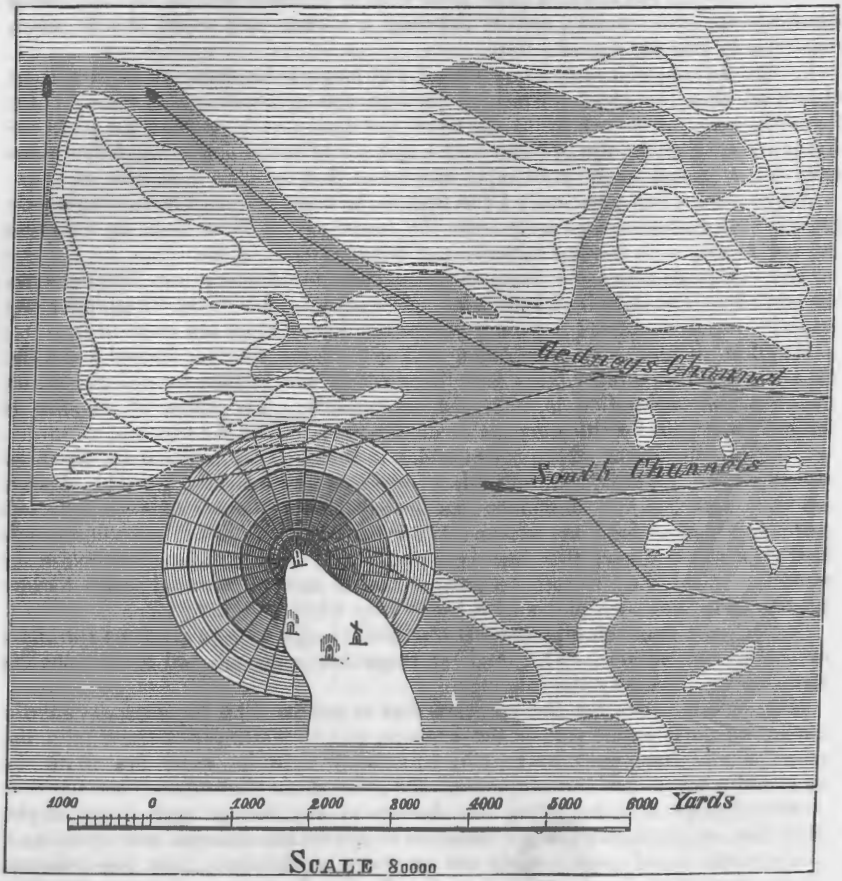
Query 2.—What reliance could be placed on vessels of war or of commerce, floating batteries, gunboats, and other temporary substitutes for permanent fortifications?

In proceeding to answer this query, I find the ground already occupied by certain propositions contained in an official document drawn up in 1840 in relation to the defences of the coast. The source from which these views emanate and their official character entitle them to full consideration, so that I do not

* To War Department, 1840.

† Susquehanna, full loaded, draws nineteen feet eleven inches.

Sketch of Hook with fort—Its fire and channel way.



The effective fire of the fort is shown by the circle.

feel at liberty to disregard them in treating the question proposed, and it becomes imperative to scrutinize them; because, if correct, they not only establish what they were designed to prove, the unfitness of naval forces for protecting the coast, but also their utter unfitness for any purpose whatever, which it is presumed was not contemplated.

The passages referred to are as follows:

* * * "Even should all these, in the form we have presented them, be objected to, we may still challenge opposition to the following broad propositions, namely:

"*First.* If the sea-coast is to be defended by naval means exclusively, the defensive force at each point deemed worthy of protection must be at least equal *in power* to the attacking force.

"*Second.* As, from the nature of the case, there can be no reason for expecting an attack on one of these points rather than another, and no time for transferring our state of preparation from one to another after an attack has been declared, each of them must have assigned to it the requisite means; and,

"*Third.* Consequently, this system demands a power and defence as many times greater than that in the attack as there are points to be covered."

To the first proposition there lies a reasonable demurrer, because, under the circumstances likely to attend the defence of any harbor or roadstead which is approached by a channel, great disadvantage must accompany the attempt, particularly when the passage lies among the shoals, of which there is no indication, save by artificial marks or the lead. Where the movements of ships are only limited by bold shores there can be little embarrassment in keeping them from danger; but where the keenest eye can detect nothing on the surface of the water to give warning of the risk, and a slight error in the course or a tide-eddy may ground a ship directly under fire, it is evident that the attention requisite to clear these obstacles successfully will prevent the officers of a fleet from giving full directions to its offensive powers, though at the very time the opposing ship may be concentrating a deliberate and destructive fire on the leading ship attempting to enter, or the assailants may be compelled by wind and weather to postpone essaying the entrance, even under these disadvantages; while thus detained he must be exposed to the severe gales and to much damage, a consideration not to be overlooked on our coast, even in the summer months. In 1778 the English and French fleets, then off Rhode Island, were separated from each other while manœuvring for the weather gauge during the month of August, and many of the heaviest ships dismasted on both sides.

On the other hand, the defending force, fully cognizant of the difficulties which await the enemy, either take such position at anchor, or under way with steam or sail, as will be best suited to annoy the enemy when most occupied in clearing the intricacies of unknown shoals, and increase the danger by concentrating a deliberate fire at a moment critical not only to the vessel most exposed to it, but to those which follow and are liable to be thrown into disorder by the least mishap.

Be it remembered that this capacity of transferring the power of its armament from one point to another is the essential quality in the present case which the fort does not possess.

Under such circumstances the most cool and brave are apt to hasten too much, naturally desiring to shorten the time of inaction, and to make some return to the fire of the enemy; hence the liability to lose the services of one or more ships in the moment of greatest need.

Well known instances of this may be cited. While standing in to attack the French at the Nile, Nelson lost the use of the Culloden, 74, which grounded on a shoal, though not even under fire at the time, and remained there useless during the whole action. At Copenhagen three of his line grounded on a shoal—the Agamemnon, 74, the Russell, 74, and Bellona, 74; and, in leaving their anchors during the suspension of hostilities, the Defiance and Nelson's own ship, the Elephant, with several others, grounded under the guns of the Three-Crown battery.

The defending force has, moreover, the advantage, if anchored, of being able to post some guns ashore so as to enfilade vessels taking the direction of its own line, and also prevent the weather ships from being doubled on by the enemy.

Every naval man will comprehend the difficulties of navigating a fleet of heavy ships along channels skirted closely by shoals and commanded throughout their extent by the guns of an enemy's line; and the advantages, on the other side, of being able deliberately to rake ships approaching in that way will be very apparent.

Among the events of the revolution may be found an apt illustration of this: In 1778 a large force was despatched from France with the view of surprising the English fleet in the Delaware. Philadelphia had been evacuated, however. The Count de Estaing followed to New York, and appeared off that harbor about the 10th of July. Lord Howe was by no means prepared for his arrival, but, nevertheless, he proceeded with energy and judgment to defend the entrance with a force vastly inferior to that of the enemy.

The French admiral, after deliberating some ten days, finally declined to attack, and on the 22d of July departed on another expedition.

On this occasion there were strong motives for bringing the English fleet to action. Their army now occupied no other of the large cities than New York. The recent evacuation of Philadelphia was not calculated to encourage the hopes of the royalists, and if "the men-of-war were defeated at this time, the fleet of transports and victuallers must have been destroyed, and the army of course fallen with them."—(Eakin, page 77.) The re-enforcements, too, arriving to succor the fleet, would have been cut off in detail. The consequence might have been immediately fatal to the hopes of the British, though favorable to the cause of humanity, by terminating a struggle which endured four years subsequently.

The difference in force seemed sufficient to justify an engagement under any circumstances. The French had twelve ships of the line, carrying eight hundred and seventy-six guns. The English only nine ships that could be brought into line, and these mounting five hundred and thirty-four guns. The disparity was even greater than that expressed by these figures, as the French carried their guns in ships far superior in size and strength to those of the British.

The main channel which the French were obliged to make use of was thus defended by Lord Howe: Five ships of fifty-four guns and one of fifty were anchored in line bearing about W.NW. from the easternmost vessel that lay near to a storeship which was armed with some guns, and anchored close in with the Hook. A battery of two howitzers and another of three 18-pounders were posted on the shore close to the weather-ship to prevent that end from being doubled on, and four regiments landed on the Hook to repel any attempt of the French to disembark troops and destroy the batteries. Three ships were placed near the bar to embarrass the passage, and a sixty-four, with frigates, lay inside of the line to be used as occasion might require.

When the French had passed the bar in sufficient force, the three ships were to retire and take the rear of the line, "which would bring their broadsides to bear upon the direct line of approach in the narrowest part of it, when, by veering again, they would resume their situations, and continue to command the long line of course which the enemy must pursue as he advances, while the smaller vessels were so placed as to harass and distress him from inaccessible positions."—(Eakin, page 86.)

The plan of defence was well conceived, and would no doubt have been carefully executed.

The French admiral declined to attack under these circumstances, and in all probability would have suffered great damage, if not defeat, if he had made the attempt.

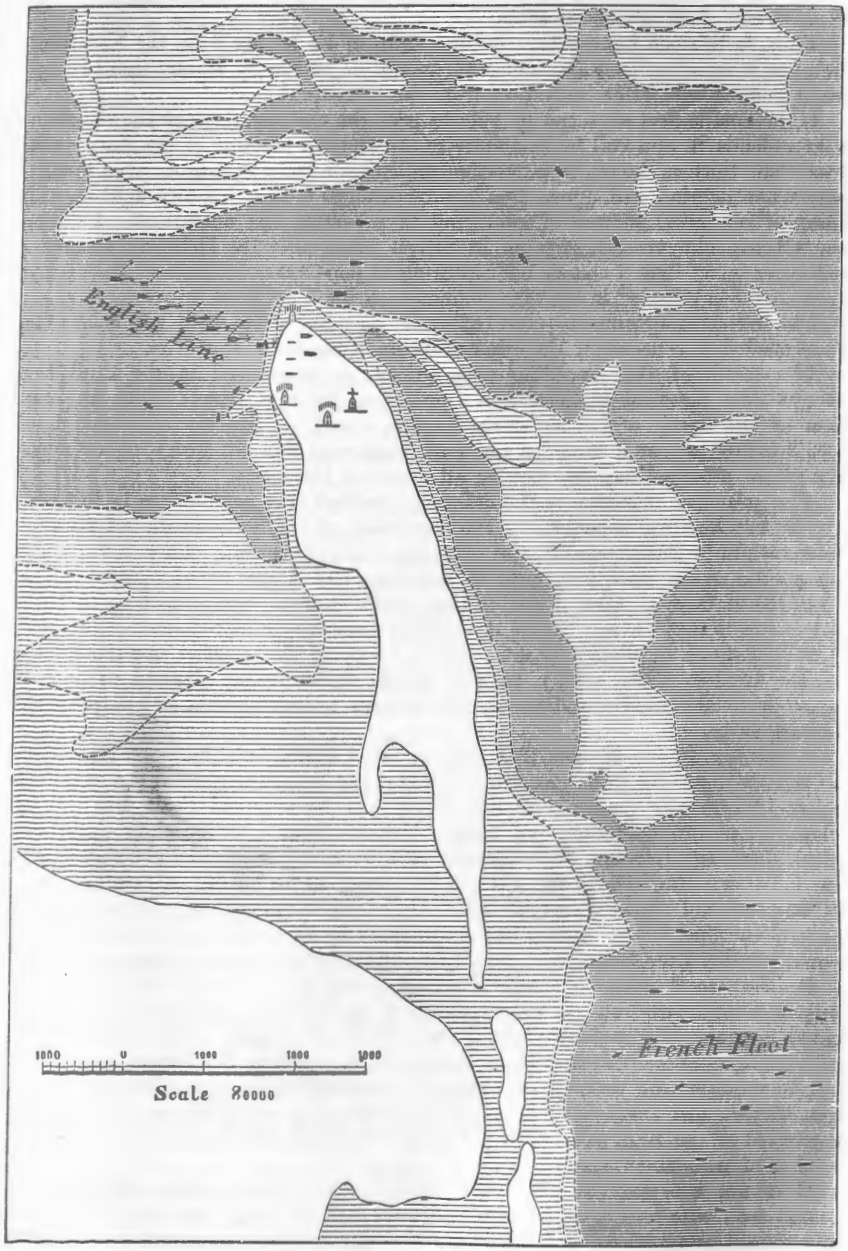
The superiority which a naval force derived from its mobility over the strongest works is very apparent in this case.

The French ships could not even pass the bar at leisure; they would have been under fire from the first in venturing to do so, and be exposed to a raking fire in approaching the British line, which they were not even at liberty to pass as they could have done, if threatened by the fire of a fort only, but would have been obliged to engage and to destroy it as an indispensable preliminary to any further operations.

Touching the second proposition, it may be said that there is no doubt now of the time that will be required to carry intelligence from any one point to another, nor of that which may be needed to transfer aid from point to point along the seaboard.

The appearance of an enemy, his force, and movements, may be known at New Orleans almost instantly after it is known at Boston, and at any point between these cities; and whatever steam force may have been posted at the principal entrances can be transferred from one of them to another at a reliable

Defence of New York harbor, by Lord Howe, against the French fleet, July, 1778.



rate of speed. Ten knots per hour is not excessive for a good ocean steamer in any weather in which an enemy would be likely to operate in a matter so delicate as forcing a disputed channel.

The question, therefore, is not whether the inferior force stationed at a port may be able to make good a final defence against an enemy appearing suddenly, but whether it may have the power to delay his movements until aid shall arrive from another quarter.

Thus, in thirteen hours after the first sight of an enemy from the Neversink heights, a squadron from the Delaware would be off Sandy Hook; and twenty-eight hours would bring up a force from the Chesapeake.

If the hostile fleet shall not be able to pass the channel, destroy the squadron that defends it, and still be in a state to attempt the passage of the Narrows in less than thirteen hours, it is very certain that a fresh squadron, even though somewhat inferior, will afford him good reason to look to his own defence, and think of retreating, instead of venturing to prosecute his operations. Finally, the Chesapeake vessels, arriving in fifteen hours after the Delaware steamers, will give more than a chance for capturing at least every steamer of the enemy that has been crippled in the engagement with the New York squadron.

The means requisite, therefore, at each port, are those that will *insure* the time needed to concentrate the other portions of the home squadron.

The result of the preceding propositions, as announced in the third, has received its practical application in a preceding passage,* thus: "The preparation by the enemy of twenty steam frigates would require the construction of two hundred of equal force on our part, supposing that we design to cover but ten of our principal harbors, leaving all others at his mercy."

The principal objection to the defensive position thus assumed to be imposed on the two hundred steamers, by the necessities of the first and second propositions, would be the impossibility of carrying it into execution. There is certainly no precedent for such a system of inaction; and if any naval officer were so disposed, it is more than probable that public opinion would hardly permit the precedent to occur here. Novel it would be to see two hundred steamers divided into squadrons at distant points, quietly awaiting the onset of one-tenth their whole number. The enemy himself would probably be alarmed at such a peculiar demonstration, and rather be inclined to look upon it as a trap for his twenty ships.

Admitting, for an instant, that any necessity could exist for pursuing a plan so strictly defensive in its character, would it not be better to send the ships out to sea, where the public attention would not be enforced to the humiliating character of the operation, and cause them to form a cordon along the coast, from Maine to Florida? This distance of fourteen hundred miles could be easily lined by two hundred ships, seven miles asunder; and being within the notice of any unusual signal from each other, the enemy's twenty ships, in attempting to pass the line, would be seen and overhauled by the ready concentration of an equal number from the cordon, before he could reach the port to be assailed.

Be that as it may, no naval officer can doubt that if the United States had fully available two hundred war-steamers of the largest class, or sailing ships of equal tonnage, the question would be entirely in regard to the character of *offensive operations*. It would no longer be an object to defend our own ports, but to capture and destroy the enemy's ships in distant seas, while protecting his colonies and trade—to intercept his commerce everywhere—to dispute the command of the high seas with his mightiest fleets, and blockade every naval station of his island empire.

It is not necessary to prosecute further objections to these propositions. Naval men, with hardly an exception, would take the very converse of the first and second propositions, and utterly protest against the consequent contained in the third. Stronger reasons have yet to be adduced to make good the position that defence by means exclusively naval is impracticable, *for the reasons given in these three propositions.*

* Engineers' report, page 14.

The practical interpretation of the second query, however, has no reference to the question of an exclusive defence by the forts or ships, so far as the Atlantic coast is concerned, if I understand rightly. The answer must necessarily be based upon the existing state of things; and as a great part of the contemplated system of coast fortification has been completed, the expediency of substituting ships, &c., has reference only to such of the system as remains unfinished.

The works for the protection of Boston and of the navy yard at Norfolk are already completed. At New York, likewise, excepting the fort on Sandy Hook. The approach to Philadelphia, however, and the anchorage at the breakwater are yet undefended, though the works have been planned and perhaps partly appropriated for.

I have no doubt when these places, and some harbor on the southeast coast, have received whatever aid can be furnished by the art of the engineer, that a naval force of no immoderate extent will be fully competent to defend the Atlantic seacoast from any attempts which an enemy would find it advisable to make.

Under no circumstances, except of the most unquestionable superiority at sea, is it presumed that it would be well to resort to a defence exclusively naval.

The ship and the fort have each a particular province in every general system of well regulated national defence, and if these can be agreed on the result will be reliable and economical. I do not mean to apply the latter word to the least possible outlay of means, but to the judicious expenditure of whatever may be required to effect the end proposed.

It is not needful here to enter into any statement of the part properly allotted to forts; this has been ably and frequently expounded by the chief engineer.

Admitting them fully, and the necessity also for the works in the principal points above alluded to, as the base for the naval operations that are to guard the intermediate points, it may be well to examine whether even the great harbors and watercourses are fully defensible by fortifications, when of the most extensive character.

Let us again revert to the defences of New York.

The first object is to prevent the occupation of the lower harbor by a hostile fleet, for if able to effect this the enemy would obtain the following advantages, according to the report of the board of engineers, (page 54:)

"An enemy's squadron being in the bay, into which entrance is very easy, would set a seal upon this outlet of the harbor. Not a vessel could enter or depart at any season of the year. And it would also intercept the water communication, by way of the Raritan, between New York and Philadelphia.

"The same squadron could land a force on the beach of Gravesend bay, (the place of the landing of the British, which brought on the battle of Long Island, in the revolutionary war,) within seven miles of the city of Brooklyn, of its commanding heights, and of the navy yard, with no intervening obstacle of any sort.

"This danger is imminent, and it would not fail, in the event of war, to be as fully realized as it was during the last war, when, on the rumor of an expedition being in preparation in England, 27,000 militia were assembled to cover the city from an attack of this sort. It is apparent that the defences near the city and those of the Narrows, indispensable as they are for other purposes, cannot be made to prevent this enterprise."

There can be no doubt of the great damage that would be wrought to the revenue of the government, and to the immense interests of various sections, by the presence of an enemy's force in the lower harbor. A heavy expenditure would be well laid out in establishing the means of prevention, and this should certainly be looked to in time.

What fortifications, then, can be applied to the purpose, and how far will they be efficacious in excluding a fleet?

A glance at the chart will show a wide extent of water between the outer extremes of land that form the harbor from Sandy Hook to Coney island; the distance is about seven miles. Large ships, however, are not at liberty to pass over any part of this entrance. Their course is confined to two channels, the principal one of which is near the Hook, and another somewhat to the northward of it, (the swash.) Line-of-battle ships can use the first only, but the heaviest steam frigate in our service, when loaded for a long cruise, only draws twenty feet, (the Susquehanna,) and therefore has sufficient water to pass in by the swash channel.

According to their report the board of engineers propose to *fortify the east branch and middle ground*, under the belief that the bottom was sufficiently permanent to receive such works. Recent surveys, however, have so far shaken such opinion as to induce them to forego the project.

The report goes on to state, (page 55:) "This may, however, be said with certainty, namely: that, all other means failing, works may be erected on Sandy Hook which will have a good action upon the channel, and under cover of which bomb ketches or steam batteries, or both, may lie. With such an arrangement there would be little probability of the lower bay being occupied as a blockading station."

I have already endeavored to make it apparent that any works on the Hook would, of themselves, be insufficient to prevent the passage of ships into the lower harbor, and it will be perceived that this is also fairly inferable from the passage just quoted, as it includes other aid in the arrangement designed to prevent the occupation of the lower harbor.

Line-of-battle ships, in taking the main channel, would, however, sustain the fire of a fort without material detriment for the eight or ten minutes required to pass it, with a fair wind and tide; and, if annoyed by the floating batteries and ketches, would not hesitate to run close to them and brush them with a few broadsides, which would probably leave them little more to do than to take care of themselves.

The heaviest steamers, by taking the swash channel, would avoid the fire of the fort and floating batteries altogether, and afterward have leisure to destroy the latter from the anchorage of the lower harbor.

So far, therefore, from believing that, "with such an arrangement, there would be little probability of the lower bay being occupied as a blockading station," it seems conclusive that the occupation of the lower harbor by a naval force would be liable to the least degree of interruption from the defences planned for that purpose. The report itself admits the necessity of using floating batteries and bomb ketches as auxiliaries, which, of all the naval means, are certainly the least worthy of reliance. With the limited preventive powers of a fort, so far as passage is concerned, they have in no degree the least of its capacity to endure battering, their material being as vulnerable as that of a ship, without its great advantage of passing from one point to another, whether far or near. And as for bomb ketches against objects no larger than ships, and those in rapid motion, it may be said that the chances of even a single bomb dropping upon them are too remote to be taken into account as a means of defence in the conditions of this case.

Conceiving, therefore, the entrance of an enemy into the lower harbor to be fairly feasible, the next matter for consideration is the capacity of the inner defences to prevent entrance into the upper harbor and the destruction of such means of war and revenue as may be found in and about the city, such as the vessels-of-war built or building at the navy yard, of the timber, ordnance, and stores, and, above all, of the extensive private establishments for manufacturing steam-engines; a purpose which, if effected, would cripple the nation in every

enterprise of offence and defence, and probably could not be remedied in the course of a war.

The levying of contributions might not be disregarded where means so ample were placed by the chances of war within the grasp of an invader. These objects individually are sufficient to warrant a military attempt on a large scale.

The number and character of the works arranged by the engineers are best set forth in the language of the "Report," page 54:

"At the Narrows, about seven miles below the city, the passage becomes so contracted as to permit good disposition to be made for defence. On the Long Island side of the Narrows is Fort Lafayette, which is a strong water battery, standing on a reef at some distance from the shore; and immediately behind it, on the top of the bank, is a small but strong work called Fort Hamilton. Some repairs being applied to these works, this position may be regarded as well occupied.

"On the west side or Staten Island side of the Narrows are the following works belonging to the State of New York, viz: Fort Richmond, which is a water battery; Battery Hudson, which is at some height above the water; Battery Morton, which is a small battery on the top of the hill; and Fort Tompkins, which is also on the top of the hill, and is the principal work. All these need great repairs, but, being once in proper order, would afford a very important contribution to the defence of the passage, nothing further indeed being contemplated for this position except the construction of a small redoubt on a commanding hill a little to the southwest. The repairs of these works cannot too soon be taken in hand, and it is hoped some arrangements may soon be made with the State authorities to that end.

"With the Narrows thus defended, and the works near the city in perfect order, New York might be regarded as pretty well protected against any attack by water through this passage."

That these works are themselves perfectly capable of resisting the attack of any fleet there is no doubt, but that they are able to interdict the passage to a like naval force is very far from being certain; on the contrary, the chances of passing, without suffering to any material extent, are reasonable enough to warrant the attempt in view of the great results to be derived therefrom.

The distance between the nearest batteries is seventeen hundred yards. The water is deep to the very shore of Staten Island, and the edge of the reef well marked, on the Long Island side, by the water battery. The largest ship, therefore, may choose the course likely to be most advantageous in receiving the least weight of metal.

If the officer in command run mid-channel he will be under the fire of both sides at a most effective distance (eight hundred yards) when right abreast of them, but by taking one side or the other he will recede from one fire, and in approaching the other be exposed to no great increase of effect.

Suppose he choose to keep the left shore and risk the fire of these batteries, while, by doing so, he will place fourteen or fifteen hundred yards between his ships and the Long Island batteries.

The sketch annexed shows the course within the scope of effective fire, which is about two statute miles. It will hardly be questioned that a decent sea steamer should run ten knots hourly (sea miles) in smooth water; these are equal to eleven and a half statute miles. Of course, she takes the strength of a flood tide and spreads every stitch of canvas to a fair wind, which ought to add another mile, making the total speed twelve and a half statute miles per hour, (three hundred and sixty-seven yards per minute,) at which rate she will pass over a mile in four and three-fourth minutes.

Tracing the assigned course through the scope of the guns on both sides, marked by the circles, it will be found that the distance run is about two miles; that is, the steamer will not be more than ten minutes under fire.

The 32-pounders and the 42-pounders of the Long Island water battery will require an elevation of about three degrees to reach the enemy, the 8-inch sea-coast howitzers about four degrees—both unfavorable to ricochet; for the projectiles will bound high in rising, and with a power much diminished even when the weather is smooth; but with the ripple occasioned by the moderate breeze, which is *supposed* to be taken advantage of, the ricochet could not be depended on for direction or force, and therefore the direct firing only will be available on the right hand, especially from Fort Hamilton, which is five hundred yards in rear of the water battery, and the guns there mounted would need at least five degrees; their shot could have no ricochet whatever, and would generally sink where they strike the water.

Taking into consideration the deviation of the projectiles and the rapid movement of the steamers, the chances of oblique impact from the incurvation of the trajectory, the variety of curved surfaces forming a ship's side, and the constant change in their manner of presentation to the direction of the ball, it is probable that not more than one shot or shell in ten can be relied on at this distance to produce a maximum penetration.

The principal work on the left, Fort Tompkins, is situated on a high hill, and two other batteries (Hudson and Morton) are in elevated positions.* Their fire is therefore not so efficacious for short distances.

To an enemy which should thus attempt to escape the fire of Fort Lafayette, by steering in with the Staten Island shore, the guns of the water battery (Fort Richmond) would be very formidable.

This work mounts twenty-seven 42-pounders,* of which it is probable that not more than a third can be made to bear on any one point.

At two hundred yards, which is to be the nearest approach of the ships in passing, the maximum penetration of 42-pounder shot in oak will not exceed fifty inches.

The time of exposure to the fire of the fort would be about fifteen minutes for a sailing ship at the rate of eight knots, and about ten minutes for a steamer going eleven knots.

Would the damage received in that time be likely to injure so many vessels as to prevent the design on the city entirely, in consequence of the reduction of the force?

In attempting to arrive at some satisfactory response to this query, one is bound to avoid possible contingencies, and to adhere to those which experience has indicated as probable.

A shell properly placed will sink a ship; a hot shot will set her on fire; but it would be very unwise thence to infer that this would necessarily be the effect of every shot fired at the ship.

The Hornet sank the Peacock in fifteen minutes; but no naval officer would infer from the fact that a sloop-of-war could generally obtain a like result. So far from that, it is unprecedented and may hardly occur again.

Uncertainty as to the distance, change of position, interposition of the smoke in a covered battery, lack of deliberation, will cause the failure of many shot to strike the object at all.

The exactly fatal spot is limited to a few inches of surface near the water line; in other places a ship will sustain a large number of shells.

The prodigious endurance of line-of-battle ships will appear to any one who will look over the records of sea fights. Hour after hour they have been known to sustain an unceasing fire at each other, with every gun on the whole broadside, and yet but one or two cases of sinking during a fight will be found.

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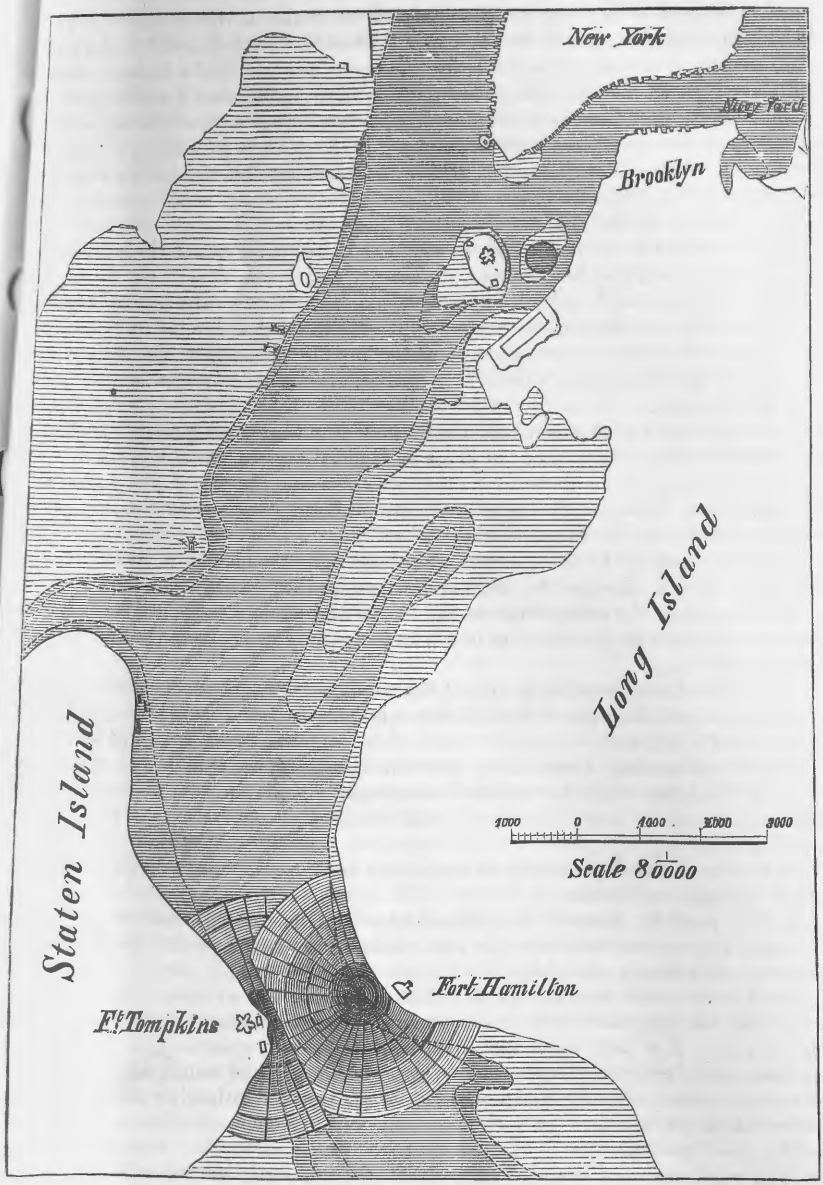
* See report of Board of Engineers.

Passage through the Narrows, New York harbor.



Let us note a few instances of endurance that have occurred in well known engagements:

In 1770 the Sandwich, ninety-eight, received seventy shot holes, seventeen of them between wind and water, (Rodney and DeGuichen.) She continued to form part of the English fleet, and cruised actively, as the flag-ship, until Rodney went home, eighteen months afterwards.

At Copenhagen, Nelson anchored his ships about three hundred yards from the Danish line, and received its fire for more than three hours. Of the fleet

not one was sufficiently injured to interfere with the active operations against Sweden and Russia that followed.

More recently, in an affair ill calculated to maintain the *prestige* of ships in attacking batteries, it will be seen that a line-of-battle ship received the fire of two batteries, of four guns each, during seven hours. The deliberate operation of one of these *with hot shot*, through the whole afternoon, was entirely unmolested by the fire from the ship, as it appears hardly more than half a dozen shots from her struck near the battery; yet she did not take fire until six in the evening. I allude to the action of the Danish ship Christiana VIII, of eighty-four guns, Eckenfjorde, 1849.

At Algiers (1816) the Impregnable received two hundred and sixty-eight shots in her hull, of which fifty penetrated below the lower deck, and three, of 68-pounders, six feet below the water line.

Even frigates will endure severe service. The Macedonian received one hundred shots in her hull in the engagement with the frigate United States, and was brought safely into port. After receiving repairs in her topworks she was used in the United States navy for sixteen years, after which she was broken up and rebuilt entirely.

In 1810 the Galatea, a small thirty-two gun frigate of eight hundred tons, received seventy-eight shots in her hull,* many between wind and water. She continued to cruise, however.

A fleet of line-of-battle ships, then, would have little to dread, it is believed, from Fort Richmond in attempting to pass it, and could probably do so without material damage. If the enemy should deem it advisable to allow the leading ship to anchor abreast the battery during the thirty minutes occupied by the line in passing, the other ships would be insured against the severest of the fire, and the entire loss devolved on one which certainly ought to endure this without being disabled.

Steamers have the additional liability of injury to the machinery or boilers, thereby suspending the action of the engine. But if their sides are lined, as they should be, with the coal bunkers, their contents would suffice to arrest the progress of the shot or shells, and prevent damage to the machinery; the explosion of the latter might be rendered comparatively harmless in the loose masses of coal, unless it were bituminous, and on that account susceptible of being ignited.

The fire of the ships would, of course, be kept up, though probably with very little damage to casemated works. The smoke enveloping the hulls would, however, tend to increase the difficulties of distinguishing from the fort sufficiently, and would embarrass the aim, while the entrance of an occasional shot into an embrasure might dismount a gun and fracture the cast iron casemate carriage into atoms, thereby doing infinite mischief.

It has been assumed that the enemy attempts the passage of the Narrows in broad day. But suppose he choose a dark night and mid-channel. The strait is more than three-fourths of a mile wide, without a shoal nearer than the shore. There is neither difficulty nor danger, so far as the navigation is concerned; and the random fire of guns at eight hundred yards, from both sides of the shore, would be a small matter.

The brief outline of the probable results of a well designed and well conducted endeavor to pass the Narrows may perhaps fail to shake the faith of military men in the capacity of the works to exclude ships. But would it be wise to trust the fate of the city even to a chance, remote as it may be? For if successful, even the board of engineers would hardly rely on the works about the city

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* In a squadron that captured the French frigate Renommée, afterwards named the *Java*, and taken by the United States ship Constitution.

as a means of further prevention. Speaking of them, (Fort Columbus, &c.,) the report says, (page 53:)

"It is a disadvantage of their positions, however, that the destruction of the city might be going on simultaneously with the contest between these forts and the fleet."

If the Narrows *are* forced, certain it is that in less than half an hour the steam frigates will be within range of the batteries of Governor's island and the small forts about the city. What now will intervene to prevent the destruction of the public works? Should the enemy choose to pass some of his ships round to the northward of Governor's island, every shot from our own guns that misses his hulls will tell on the devoted city, and effect more damage than the enemy himself would, in cold blood, be willing to inflict. A force now may also be detached to the navy yard and other places. Rockets, carcasses, and shell put in operation, and in a few hours the flames will strip us of the public and private resources. If a detachment be landed, meanwhile, to aid, the work will be done effectually; and the ebbing tide convey the fleet to the lower harbor, there to intercept the commerce and to blockade. Two or three steamers of the attacking force may be destroyed, the detachment on shore cut off; but what would such losses be in comparison to those inflicted?

In the conclusion from certain premises, then, the views here entertained accord with that of the engineer's report, as thus expressed:

"If the mere passing under sail, with a leading wind and tide, one or even two sets of batteries, and then carrying on operations out of the reach of these or any other, *were all*, the enemy might perhaps accomplish it."

At the same time there can be no doubt that the defence of a port may be made good, when its shore line permits of the condition prescribed by the report as sufficient, thus:

"Batteries should succeed each other along the channel, so that the enemy may nowhere find shelter from the effective range of shot and shells while within the harbor, even should he succeed in passing the first batteries. Provided the shores admit this disposition, and the defences be supplied with an armament, numerous, heavy, and selected with reference to the effects on shipping, the facts we have quoted from history show that these defences may be relied on."

The only question will be as to the certainty of so disposing the land works.

Other passages which occur in the report of the board of engineers seem far more applicable to the case under consideration, and I cheerfully avail myself of them as fully expressing all that I desire to add on this head.

"There are, doubtless, situations where it may be necessary for us to present a defensive array, at the same time that to do so by fortifications alone would be impracticable; and it is not, therefore, prejudging the question we are about to examine; it is neither underrating fortifications, nor overrating these floating defences, to say that these last are, some or all of them, indispensable in such position.

"Any very broad water, where deep soundings may be carried at a distance from the shores greater than effective gun-range, and where no insular spot, natural or artificial, can be found or formed nearer the track of ships, will present such a situation, and we may take some of our great bays as examples.

"Broad sounds and wide roadsteads, affording secure anchorage beyond good gun-range from the shores, will afford examples of another sort; and harbors with very wide entrances and large surfaces exhibit examples of still another kind.

"As in all such cases fortifications alone will be ineffectual, and, nevertheless, recourse to defences of some sort may be unavoidable, it has not failed to be a recommendation in the several reports on the defence of the coast since 1818, that there should be a suitable and timely provision of appropriate floating defences. And until the invention of man shall have caused an entire revolution

in the nature of maritime attack and defence, these or kindred means must be resorted to; not, however, because they are means intrinsically good, or suitable under other circumstances, but because they are the only means applicable."

Admitting, then, that "any very broad water, where deep soundings may be carried at a distance from the shores greater than effective gun-range, and where no insular spots, natural or artificial, can be found or formed nearer the track of ships, will present such a situation; and we may take some of our great bays as examples," as a premise to the second query, then what auxiliaries shall be resorted to? Of all those which, in connexion with permanent works, might be selected to control effectually the channels of our principal watercourses and harbors, none are less reliable than floating batteries and gunboats.

In the well-constructed fort, the chief merit is a capacity of endurance almost impregnable to the assaults of shipping.

In the ship, a mobility which gives the facility of transferring the great power of her battery to any part of the channel that may need it. The disadvantage of one is its immobility, which restricts it to a fixed point, whence it can control nothing beyond gun range; of the other, a vulnerable material very susceptible of damage from protracted battering.

The floating battery unites the weak points of both fort and ship. It is neither spear nor shield, and is altogether objectionable, as inefficient, costly, and unsuited to the character and resources of a great nation. Its worthlessness as a defence is well manifested by the affair at Copenhagen in 1800, under circumstances when, of all others, it would have been most gratifying to every sense of justice that it should have protected the neutral rights of a brave but feeble nation. On that occasion there were six hundred and twenty-eight guns mounted on a line of floating defences, supported, as well as the urgency of the case admitted, by several forts and a reserve of heavy ships.

Nine English line-of-battle ships entered the channel skirted by the Danish line; commenced action at distances varying two hundred to four hundred yards, captured and destroyed the Danish floating batteries in three or four hours, and sustained no damage sufficient to interfere with their proceeding against the other parties to "armed neutrality"—Sweden and Russia.

The report of the board of engineers, previously referred to, embodies many interesting details of this event, to which the only material objection is the mode of stating the force.

1st. The Bellona, 74, and Russell, 74, grounded on the edge of the shoal, having their own line directly between them and the Danes, so that their fire could be of little avail, though themselves might be much damaged by the shot from the enemy which missed the English line.

2d. The frigates and sloops had been directed to take the stations of these ships opposite the *tick rouer* battery, so that of the twelve line-of-battle ships only nine were opposed to the floating batteries, being about *fifty* guns stronger than the Danish line, and not *three hundred and eighty-two*, as the report infers.

One of the board of engineers' deductions from this engagement is so conclusive that it may be quoted without further comment. It is thus (page 20:)

"That it illustrates strikingly the advantages that a fleet possesses over a stationary line of floating defences. Lord Nelson was superior to the whole of his adversary's floating force; but not being disposed to run any unnecessary hazard, he directed all his force upon a part of the Danish line, which was of course defeated; and had there been no other than a floating force present, so of course would have been the remainder, had it been twice the strength it was. This example fully confirms what we have before urged on this topic."

Some idea of the expense of large floating batteries may be gathered from the paper of General Gaines on coast defence. Those proposed by him were to carry one hundred and twenty to two hundred cannon. The estimated cost by

the chief naval architect was $1,400,000, for each of the batteries with its tow boats; which sum would build three line-of-battle ships or two war steamers.

It is further to be urged, that any such passive system of defence is entirely at variance with the tone and temper of our people, and the reputation of a powerful nation. The national policy may be strictly defensive, but when compelled to resort to war, its system of operations should be rather offensive in its character, if it were only to enforce the sound maxim of preserving its own soil from the desolating presence of an enemy.

If the floating battery is the most useless of all the stationary defences, the gunboat may be considered as the most miserable of all the war craft that sail; nothing more effectual could possibly be devised to render skill and bravery unavailing. The experience which we have already had has sufficiently confirmed opinion in the navy as to the dependence that may be placed on the performance of these pigmy warriors, and renders it needless to occupy time in any labored exposition of their worthlessness. In reciting the events of past days, our own naval historian (Cooper) has very distinctly given his estimate of their demerits, which, by the way, he does not altogether confine to the question now at issue, of capacity for offence and defence, if we may judge from the following pithy paragraph:

"This was the development of the much condemned 'gunboat system,' which for a short time threatened destruction to the pride, discipline, tone, and even morals of the service."

It is singular, however, that two distinguished statesmen should, about the same time, have given their faith to the efficacy of the gunboat—one in England, and the other here. Mr. William Pitt, about the year 1803, in a motion censuring the ministry, found a strong reason in their neglect to provide more gunboats. Admiral Sir E. Pellow, then in Parliament, was unable to sustain his political friends in the measure, and in a short and characteristic speech used these words:

"As to the gunboats which have been so strongly recommended, this mosquito fleet, they are the most contemptible force that can be employed."

About thirteen years later it fell to his lot to verify this opinion. In his memorable attack on Algiers, it is stated that "soon after the battle began the enemy's flotilla of gunboats advanced, with a daring which deserved a better fate, to board the Queen Charlotte and Leander. The smoke covered them at first, but as soon as they were seen, a few guns, chiefly from the Leander, sent thirty-three out of thirty-seven to the bottom."

Dispensing then, with such inefficient aids, there remains for consideration the navy proper, which, it may be asserted, is indeed not only a sure reliance, if it be properly constituted, but is indispensable to any degree of security along our line of coast, now washed for thousands of miles by the two great oceans; and also to maintain the communication by water and the isthmus between the Atlantic and Pacific States, where forts, floating batteries, and gunboats can no longer enter into the question, even were they a perfect defence for every other interest covered by our flag.

In the first place, it is believed to be susceptible of proof that a naval force, somewhat greater than the attacking force, may be relied on in connexion with the present or proposed works at Boston, New York, Delaware, Chesapeake, and some southeast port, to protect the coast from Florida to Maine, and (as corollary to this proposition,) will destroy or capture the enemy that may commit itself seriously against either of these ports.

To illustrate this, I will assume the attacking force to be *the* twenty steam frigates of the engineer's report of 1840. To New York harbor, to Delaware and Chesapeake bays, would be assigned a certain number of ships, varying with the peculiar circumstances of the time; for the present, let us assume the defending force to be stationed thus: New York ten ships, Delaware eight, and

Chesapeake seven; and to avoid the recounting of local details, I again recur to New York as the object selected by the enemy.

The stationary floating defence to be used will be the old sailing frigates and line-of-battle ships of the navy, having heavy batteries on the gun-deeks, and pivot pieces of the largest calibre on the upper deck. Every spar taken out, even to the lower masts, and the ships well secured with several chains to their moorings; one at A, to bear on the ships in crossing the bar; three at B, C, and D, to close the swash channel; and one at E, inside of the southwest spit; which, with the fort on the Hook, is to assist in defending the main channel.

The enemy's twenty ships are signalled from the Neversink heights, and in half an hour the Delaware and Chesapeake squadrons are at sea steering north.

It is obvious that any loss of time from irresolution or from want of information which is to be obtained by reconnoitring, must be to the disadvantage of the enemy.

Suppose him well supplied with pilots, which, in a war, the Cunard line can furnish abundantly, and aware that reinforcements are on the way, it is probable that the attack will be commenced without delay.

The first point of defence is at the bar; the deep water here is so narrow that the enemy will hardly risk his ships in any one channel, even in two columns, and his line is therefore exposed to the concentrated fire of our ten ships, and of the line-of-battle ship at A.

After crossing, the van will endeavor to form the line abreast, as far as the channel admits, in order to relieve the leading ships; but our own ships recede before them, and by this time the guns of the line-of-battle ships B and C are beginning to tell. Following our steamers, the enemy soon comes within the fire of the fort, and advancing onward, the line-of-battle-ship at E is brought into play. The headmost of his ships have now for more than half an hour been under the concentrated fire of four hundred pieces of the heaviest calibre; and it is hardly possible that they should not be incapacitated for moving with any rapidity. Even if their offensive powers be undisabled, they must therefore be soon dropped astern by their main body moving with full speed, and their force be lost in the rest of the day's operations. On the other hand, our own ships have felt the fire of the enemy's leading ships only, and if any one be damaged, can anchor near the fort or line-of-battle ships, and do good service on the passing ships.

It is probable that in rounding the southwest spit, the number of the hostile fleet will be reduced to fifteen or sixteen ships, capable of full motive power, if an average degree of success have attended the defending force. And these must be brought to action before reaching the city.

Without pretending to indicate the precise time and place most proper for this, suppose that it be decided to make a stand before entering the Narrows.

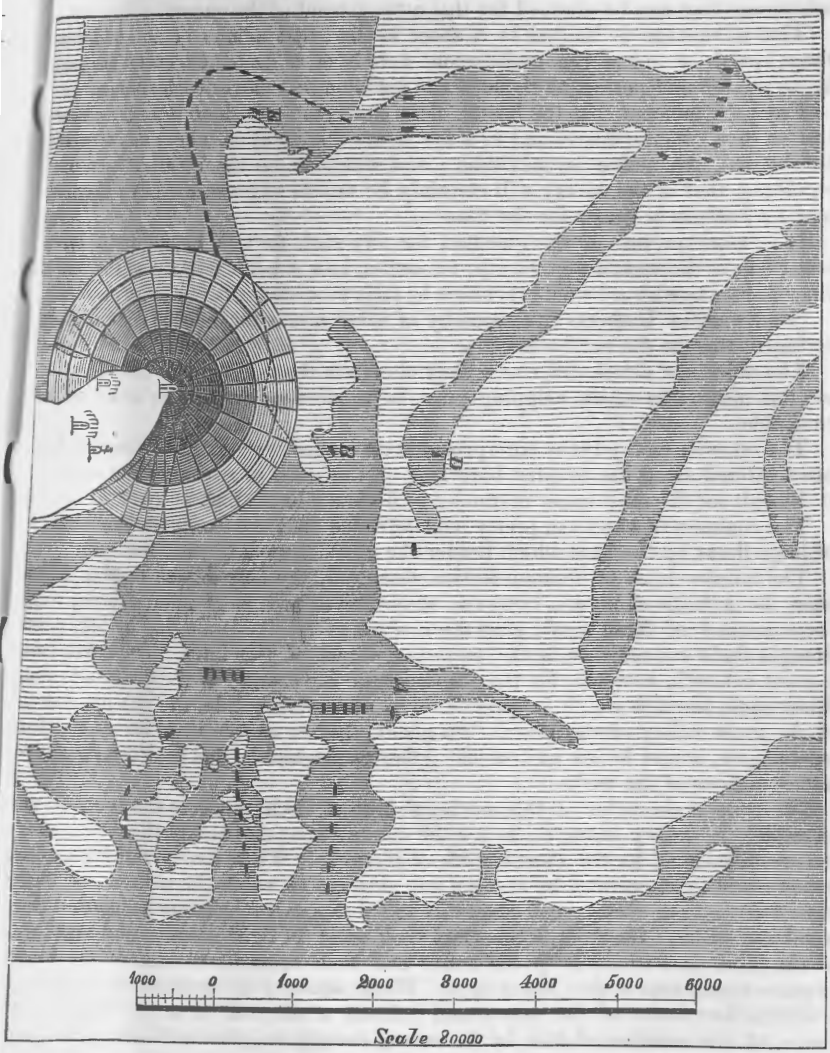
When it is evident that the enemy will not attempt to force the swash, and has followed the main channel, the line-of-battle ships A, B, C may slip their moorings and be towed by river steamers on each side up the swash, their draught having been adapted to that purpose, and take in moorings previously provided at the *debouche* of the channel into the main course below the Narrows.

Our own steamers will here prepare to receive the attack, or to make it if declined by the enemy, who may adhere to the main purpose of reaching the city.

The action will, of course, terminate in the defeat of the weaker party, though not necessarily in the destruction or capture of his ships. But in what condition will the enemy find his ships? How many of his steamers will there remain to attempt the passage, and what will be their capacity to do it after the rough handling that has been experienced?

It may be that not one of his vessels has struck its flag or is disabled, but the power of moving with certainty and speed is crippled, and their exposure to the

Proposed defence of New York har'or.



fire of the forts therefore so much increased in time as to render the attempt hazardous. Pieces of heavy ordnance can also be mounted on stout merchant ships and steamers, forming a reserve to be placed along the passage where the guns of the forts do not command, so as to sustain a steady cannonade on whatever ships of the enemy may remain in a condition to proceed. Meanwhile a few hours will bring up a fresh squadron, and soon after this will be reinforced, so that fifteen steamers in perfect order will enter the bay. The result must be the capture and destruction of the invading force.

This is the view which I consider fairly presentable of the favorite case so frequently urged, wherein the advantage is enjoyed by the assailing party of selecting time and place without warning to the defending force.

It seems highly probable that the defence of any important point, with some

exception as it regards the southeast and Gulf coasts, can be made good with no greater additional force in the aggregate than above mentioned, admitting every advantage that can be claimed for this arrangement of the enemy.

That advantage is limited to a space in time that admits of no accident to force, speed, or any of the multifarious details of a fleet. Its operations must be as precise and perfect as those of the machine that moves each steamer.

From the moment that the hostile fleet comes in sight there is a sure concentration of a superior force, and in a few hours there will no longer be the power to choose. An action is inevitable; and whatever be the result to our own squadron, that of the enemy will certainly be unable to prosecute any enterprise against harbors or coasts for the time.

It is, however, out of the question for any such fleet to hazard itself on a coast where the certain superiority, no matter how small, exists; and the entire line of shore northward would therefore be fully secured against an enemy's vessel.

Southward of Hatteras the necessity of naval means for defence is even more stringent than to the northward.

The objects of attack differ as widely also from those just under consideration as the manner in which shipping must be applied to defence in order to be available.

The resources of private enterprise are no longer aggregated so densely, but are scattered along the country bordering on the coast in a manner that renders it difficult for the most eager marauder to do much in his line.

The commercial cities are pretty well defended from the extensive movements of large fleets by the bars which border the channel-ways to their harbors.

The interior lines of communication formed by the long downs of sand that skirt the Atlantic shore are, however, accessible to vessels of inferior force, and the command of these would give the control of all the trade that by its light draught finds convenience in the smoother waters of the inlet. The most important debouch, however, for the resources of the country is the outlet of the Mississippi, through which is poured, in a never-failing tide, the rich products of the great valley of the river. To check this, to impede it, to harass in the least degree, would be an evil of the greatest magnitude, and be felt in the remotest regions of the west.

The general character of the southern shore of itself prevents the operations of vessels of heavy draught; hence the defence must be nearly the reverse of that recommended for the shores north of Hatteras. There heavy ships will lie inshore, and light cruisers be thrown out seaward to watch the motions of the main force of the enemy, and coastwise to check small marauders or parties for wood and water. On the southeast and Gulf coast the light steamers and vessels of the third class would keep the inlets and their approaches and the various avenues contiguous to the Mississippi. While seaward the heaviest ships must abide the first brunt of the attack and defence at all risk, so as to cripple the forces of the assailant should he be strong enough to close with the inshore squadron.

The true and only key, however, to the defence of these shores, and to the immense interest there collected, is the Havana. The island to which it belongs enters its western extreme into the Gulf, leaving but two passages for vessels so narrow as to be commanded with the greatest facility; these are the great thoroughfares of trade and the mail steamers from New Orleans to California and New York. Hence if the use of the Havana be even at the disposal of an enemy while in the hands of a neutral power, each and all of these interests could be with difficulty defended, even by a superior naval force, and never guaranteed against severe losses. While from it as a United States port, a squadron of moderate size would cover the southeast and Gulf coasts, protect the foreign and inshore traders, and secure the lines from New Orleans or New York to the Pacific States by way of the Isthmus, its occupation would necessarily

the object of every expedition, military or naval, preliminary to any attempt on the southern trade or territory.

At present the force of large vessels for the southeast coast would be obliged to use the harbor of Brunswick as their depot, refuge, and centre of operations. The report of the commissioners has already decided this to be the best south of the Chesapeake. With the command afloat, Key West and the Tortugas might be used, but not otherwise, as no supplies are to be had at either, and no water at the latter. Pensacola would have to answer for the Gulf shore.

The coast of the Pacific States differs in many respects from that of the Atlantic in formation as well as in condition.

The circumstances of settlement, product, and trade have yet to determine much that will govern in the extent and application of the elements of defence.

At present there can be no doubt that the two great harbors at San Francisco and the Columbia river will require immediate measures for their protection. The sites of land works have probably been vindicated by the engineers sent for that purpose, though some time must elapse before these can be completed.

It seems, therefore, that the naval force in these regions should be of the most effective character in power and number, singly and collectively, inasmuch as it must for a while be the exclusive reliance for a defence of any kind of harbors, as well as of coasts. The squadron should always be able to land at any point a force of two thousand seamen and five hundred marines, which, with twenty or thirty of the boat howitzers on their field carriages, would be found an effective auxiliary in emergencies.

The manner in which our own squadron operated along the coast of California while held by the Mexicans will best exhibit the character of the attempts likely to be made by an enemy against our own people now inhabiting that State. If the views above expressed, in relation to the defence of the United States harbors and coasts, be correct, it then remains to consider the species of naval force which will be required to perform the part assigned to it.

By referring to the navy list it will be seen that the number of heavy ships that is available, or could be made so by necessary repairs, consists of nine line-of-battle ships, twelve frigates, and five steamers.

This force is obviously too small for the objects for which a navy should be designed. If the number already assumed to be required for the defence of the Atlantic coast in war be applied to that purpose, it would leave a very insufficient force for the Pacific shores, for the protection of the line of communication by sea between the Atlantic and Pacific States, and for general cruising to cover our own commerce, and annoy that of the enemy.

Not only is the effective number of the present navy too small, but the character of the force has been depreciated to a very serious extent by the superior powers of offence that have been conferred on the large steamers that now constitute part of a navy here and elsewhere. The cannon carried usually as the main reliance of line-of-battle ships and frigates are thirty-two and forty-two-pounders. In our service the latter calibre may be considered as exceptionable, inasmuch as it is not recognized by the regulations of 1845.

The war steamers carry sixty-four pounders. It is true that the line-of-battle ships may have one hundred of the thirty-two-pounders, while a steamer of the same tonnage has but three of the sixty-four-pounders.

But it will be admitted that if the constituent of one battery is deficient in any one element of power, which is possessed by that of another battery, that no mere increase in the number will compensate for this defect. Thus, if the thirty-two-pounder shot fired with nine pounds of powder be inferior to a shot of sixty-four pounds fired with sixteen pounds of powder in the distance to which it will range with sufficient force to do material damage, then it is plain that so long as that distance can be preserved it will matter little whether a ship oppose one hundred or one thousand thirty-two-pounders to the three sixty-

four-pounders: she will receive constant damage from the repeated efforts of the *small* number of large pieces without the power of inflicting any harm by her *large* number of *small* pieces. A similar relation, in effect, may be noted in the effects of other military projectiles. Thus, we know that grape from a thirty-two-pounder would be harmless against the side of a ship, when the shot would pass through easily, and yet the stand of grape is composed of three-pound shot which, even if fired separately, would still be very little nearer the effect of the thirty-two-pounder shot.

The important question is in relation to the capacity of the steamer to maintain the distance suited to her powers of annoyance—and of this there can be little doubt since the passage between the United States and England is made with ease and certainty in the severest winter weather by the steam packets, their average speed being then seven to eight knots with fair and foul winds, and they could in all probability go very little below their highest rate in any weather in which cannon could be used.

Those who have witnessed the performance of the Mississippi in some of the Mexican "northers" know what can be done by a good steamer in a strong gale. Thus the twenty steam frigates would be very unequally matched in action, by our covering squadron of sailing ships with the thirty-two and forty-two-pounders, if it could be said that they were matched at all. The remedy for this is not difficult, and can readily be attained by a reorganization of our armament, though it would be more expensive to adapt the present sailing ships fully to the ordnance which experimental practice has indicated as preferable than to build new ships. Thus a two-decker would carry the same weight of metal, but not the same number of cannon. Hence, it would become necessary to reduce the number of ports, and to re-distribute them along the broadside; and to do this, the whole planking and frame, nearly to the water's edge, must be removed and replaced to suit the changes required in piercing the side with the proper number of ports—involving an expense equal to half the cost of a new ship.

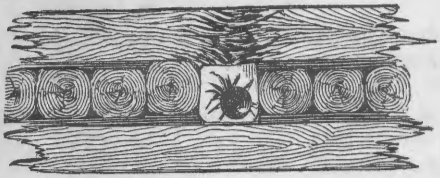
They would still need an addition that could not be dispensed with, which is an auxiliary steam power sufficient to give a moderate rate in a calm, in manœuvring or in getting out and in harbor. For this purpose, greater length would be required than any of our present frigates possess, as they now barely stow the provisions and water required for distant cruising. If these ships be cut and lengthened, the cost in connexion with that necessary for heavier ordnance will be fully equal to the expense of building new ships with every disadvantage that can attach to a sacrifice of unity of design in model; for no skill in the builder could possibly develop any one essential of form in this piece of patchwork, except by mere accident.

The true policy, not only as regards economy, but in reference also to accomplishing the object in view, is to commence without delay the reorganization of our naval power by the gradual addition of ships built upon the most recent models, and to carry heavy ordnance as well as an auxiliary steam power.

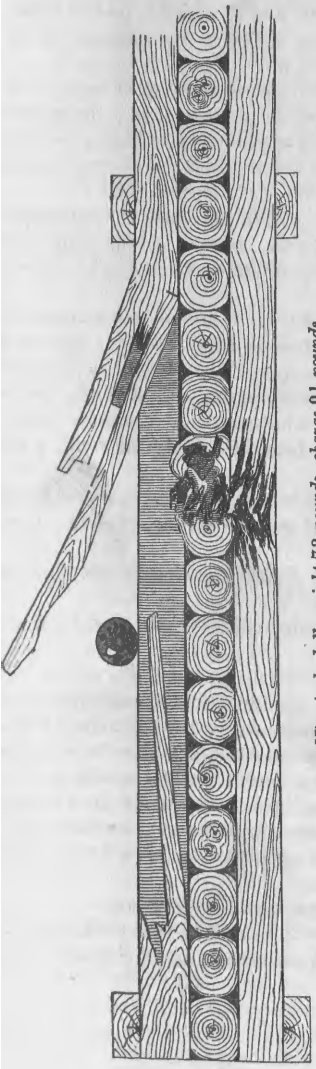
The experimental practice at the navy yard has developed some points of interest in relation to the pieces likely to combine the several essentials of accuracy, range, and force, and the bearing of all the results has induced me to propose the construction of a class of ships designed to unite a higher degree of efficiency than any frigate or seventy-four mounting the present armament, &c.

Instead of twenty-six thirty-two-pounders, and four eight-inch shell guns on the gun deck, the new frigate is to carry twenty-six nine-inch shell guns. The comparative penetrating power of the two pieces is shown in the sketch annexed: The thirty-two-pounder shot passed twenty-one inches into an oak target, three-fourths of a mile distant. The nine-inch shell, uncharged, broke through the whole thickness of thirty inches.

Fig. 1.



Shot from a long 32-pounder, charge 9 lbs.—Penetration in oak, distant 1,300 yards, thickness 30 in.



Nine-inch shell, weight 73 pounds, charge 9½ pounds.

The diminution of force which both would undergo at greater distances would lessen the power of the thirty-two-pounder shot yet more, while the nine-inch shell would still retain every advantage arising from its explosive power. The only pieces of the present force that would approach it being the two eight-inch shell guns, which, in number and intensity of effect, are not comparable to the thirteen nine-inch shell guns.

If the distance were lessened, the broadside of nine-inch shell guns would in weight of metal alone be nearly double that of the thirty-two-pounder and eight-inch shell guns.

On the spar deck are to be no broadside guns, but, in lieu thereof, seven shell guns, of ten or eleven-inch calibre, on pivots, and capable of being pointed around the circle in every direction.

An auxiliary propeller power will be placed astern, for which purpose the length of the ship must be adapted to its convenient reception.

The points of this ship will be:

1*st. Cost of Construction.*—This ought not to exceed the cost of an ordinary sailing frigate, with the additional expense of steam equipment.

The St. Lawrence cost about $350,000; and the cost of a suitable engine, boilers, &c., as furnished by Kemble, would be about $70,000;—total, $420,000.

The Susquehanna steam frigate cost very little less than $700,000.

2*d. Force.*—The broadside weight of metal of the new frigate would be about 1,800 pounds. The Pennsylvanian, three decker, present armament, 2,100 pounds. The Ohio, two decker, 1,500 pounds.

Comparing the long range with that of the steam frigate.

New ship, seven pivot guns, 11-inch	940 pounds.
Susquehanna, three 64-pounders	192 "

3*d*. *Cost in commission.*—Only greater than that of a sailing frigate when steam is used, the crew not exceeding six hundred men, which is about that of the Congress frigate.

Comparing such a frigate with the heaviest steam frigate, it will be seen that the advantages are, far greater superiority in range and force, as the propeller frigate opposes seven 11-inch shell guns to three 64-pounders, the relations of which are about those of the 9-inch to the 32-pounders; and though her speed by steam is not equal, yet if the steam frigate once commit herself to the chances of a combat she will be beaten, for her motive power is far more vulnerable in nearly every point, and if deranged in the least by any of the contingencies of an engagement, she is at once exposed to the nearer approach of the *propeller*, and consequently to the full effect of the broadside guns, while her opponent loses but an auxiliary power, if any of her machinery be touched, her defence being made good against the steamer at any distance or position which the latter may select.

If opposed by the ordinary line-of-battle-ship with the present armament of 32-pounders and 42-pounders, the propeller frigate may, at a long range, play her seven pivot guns with comparative impunity, or she may close and bring into action the whole broadside.

Of course it is not designed to assert that the navy would be constituted of this force exclusively, but only that on such a class of ships reliance might safely be placed for defence of the coasts and harbors against any of the heaviest ships in foreign service. In time of peace they would cruise as flag-ships, while the inferior classes might receive pieces of such calibre and number as would be suitable.

The second class would be ships with a light deck over the battery and a pivot gun on the to'gallant forecastle and poop.

The third class, ships with a light deck over a broadside battery, or else neither light deck nor broadside pieces, but heavy pivot guns to the extent of the accommodation.

All the vessels of lower rate to be steamers of five hundred to one thousand tons, mounting two pivot guns.

Query 3. Is it necessary or expedient to continue the system of fortifications on the shores of the northern lakes?

It would be a loss of expenditure already incurred not to finish the works which have been commenced on the northern frontier, and these would certainly be useful in the initial operations of a war; though there can be but little doubt that if it ever becomes necessary to direct the military operations of the United States to that quarter, the population of the States that border thereon would furnish a force fully sufficient to a prompt and final issue against any army that could be sent from England. It may indeed be questioned whether any decent opportunity for severing a connexion so expensive and unproductive would not be very acceptable to the government of Great Britain.

I have the honor to be, very respectfully, your obedient servant,

JNO. A. DAHLGREN,
Lieutenant United States Navy.

Hon. C. M. CONRAD, *Secretary of War.*

F.

Order to the Chief Engineer.

WAR DEPARTMENT, *April* 17, 1851.

The chief engineer will please prepare and report to the department the information called for by the second of the enclosed resolutions.

He will also, at as early a period as practicable, submit to the department his views and opinions on the subject embraced in the first of these resolutions, and will request Colonel Thayer, Lieutenant Colonel De Russy, Major Delafield, and Major Chase to submit to the department their views and opinions in relation to this subject.

It is desired that the chief engineer and the above-named officers should direct their inquiries particularly to the following points:

1st. How far the invention and extension of railroads have superseded or diminished the necessity of fortifications on the seaboard.

2d. In what manner and to what extent the navigation of the ocean by steam, and particularly the application of steam to vessels-of-war, and recent improvements in artillery and other military inventions and discoveries, affect this question.

3d. How far vessels-of-war, steam batteries, ordinary merchant ships and steamers, and other temporary expedients, can be relied upon as a substitute for permanent fortifications for the defence of our seaports.

4th. How far the increase of population on the northern frontier, and of the mercantile marine on the northern lakes, obviates or diminishes the necessity of continuing the system of fortifications on these lakes.

C. M. CONRAD, *Secretary of War.*

The CHIEF ENGINEER.

No. 8.

Report of Lieutenant Colonel R. E. De Russy.

FORT MONROE, VIRGINIA, *July* 26, 1851.

SIR: Being called upon by the instructions of the Hon. the Secretary of War to present my views and opinions on certain points specified in his letter to the engineer department of April 17, 1851, I beg leave to place before you the following observations upon the subject, which I request you will lay before the Secretary of War.

Fortifications had their origin with the Greeks, and have been adopted, improved, and perfected by all civilized nations from that time to this. They long since have become a combination of sciences, involving mathematics, pyrotechny, strategy, and the art of war. The objects of fortifications are to make strong by art what otherwise would need an accumulation of active physical means, as also to protect exposed positions from sudden assaults of an enemy. In producing the first result, they leave at the disposal of the country invaded or attacked an active force which otherwise might be kept in check by an equal or superior one. Again, they secure in a great degree, within certain distances, positions rendered important either by their location or the magnitude of their commerce and resources; hence all important seaports should, in my opinion, be protected by suitable fortifications.

1st. Because otherwise an enemy's fleet might for a time with impunity ride

in safety in our harbors, and harass or even destroy the commerce and property in those harbors.

2d. Because they become dangerous barriers, which an enemy is seldom disposed to leave behind him, the custom of war being to attack fortifications when offensive operations are intended to be carried on by an enemy beyond their localities; and finally, a fortification is the usual depot for all munitions of war, both in implements and provisions. The heavy ordnance, so essential to our present system of defence, could hardly be stored in safety elsewhere, unless at such distances from the seaboard as to render their transportation tardy and perhaps hazardous to the several points where they might be immediately needed. I will close these preliminary remarks by adding, that fortifications give confidence at home and mistrust to an enemy, and compel him to make additional and costly preparations, both in money and time, when he expects to come in contact with them.

I will now proceed to give my views and opinions on the several points enumerated in the Secretary's letter to the chief engineer, and will discuss these in the order in which they are presented.

1st. I look upon the invention and extension of railroads as of important advantage during a state of war, so far as the rapid transit of both troops and munitions are concerned, but that advantage might be too much depended upon.

Railroads are so easily impaired or destroyed that it would be dangerous to depend entirely upon their use. An enemy would naturally weigh the value or importance of such conveyances, and would offer such high rewards for their destruction as would be likely to meet with success. It is well known that our railroads are generally constructed through the most uninhabited portions of our country, and are in consequence liable to be approached and destroyed by mercenaries, who would run many risks to obtain rewards commensurate with the importance of the undertaking.

I have already remarked that without fortifications our harbors and seaports would be exposed to an enemy's fleet, and I now give it as my opinion that all the facilities afforded by the railroads that centre, for instance, in and about the city of New York would not prevent an enemy's fleet from destroying that city, were it not protected by suitable fortifications. The same result would undoubtedly attend any other of our important commercial cities on the seaboard; this opinion is based upon the supposition that an active and competent naval force would be employed by the enemy to attain these important results by a sudden attack, and that, too, combined with an adequate number of troops in case it would be found necessary to make a simultaneous one.

We have had during the late war with Great Britain many instances to warrant this opinion. I will cite a few of them to show the necessity of fortifications in our harbors.

The defence of Fort McHenry saved the city of Baltimore. The defence of Craney island saved Norfolk and the navy yard at Gosport. The temporary defences at Sandy Hook, New York, prevented the blockading squadron from entering within the waters of the bay, and compelled the ships every evening to make an offing, thereby giving an opportunity to our merchant vessels to slip out of the harbor. These latter defences were insignificant in themselves, but they acted in conjunction with some fifteen or twenty gunboats, each mounting one gun, which were generally anchored in the cove, and ready at any time to co-operate with the fort and block-house erected on the Hook; and had Fort Washington been defended instead of being destroyed, it is my opinion that the Capitol of the Union would have remained unmolested during that war.

2d. The navigation of the ocean by steam, and the application of steam to vessels-of-war, would seem, in my opinion, to increase the necessity of fortifying our sea-coast. The great advantage of steam power lies more in the certainty of accomplishing an object in a given time than in increasing the strength and

power of an enemy. In other words, an expedition planned for a particular point on our sea-coast by a transatlantic power can be calculated to a day when steam vessels are being employed for the purpose; but those steam vessels, in the presence of or passing our fortifications, are more exposed to be injured by our forts than ships-of-war would be. The machinery of the one cannot be well protected, consequently is easily impaired, and when impaired, the steamer's motive power is either retarded or entirely suspended, whilst the other is so constructed as to be at times crippled in her hull and even her spars by shots, without losing much, if any, of her way in passing a battery.

I have just said that the certainty of arriving at a particular point at an appointed time is the advantage obtained by the use of steam in vessels-of-war; that advantage is a great one, and the only means to counteract it is to have permanent defences where it is likely an enemy would endeavor to surprise any one or more of our seaports.

I believe it to be demonstrable that, with our present system of fortifications, provided, as they are intended to be, with the heaviest mortars, howitzers, and columbiads, the advantage on our side would be increased had we to contend against war steamers instead of ships-of-the-line.

The difference of speed between the two kinds of vessels when within shot distance from our forts is more than counterbalanced by the greater surface offered in the length and breadth of the deck of a steamer, and the constant exposure of her machinery to curved fires.

The machinery of these war steamers is supposed to occupy about one-fifth of the length of the vessel; one single shell or shot passing through that portion of her hull would in all probability injure some part of that machinery, and delay or stay her progress. With our heavy guns we may calculate to reach with certainty and effect an enemy's vessel at the distance of two miles. If that vessel is compelled to pass under our guns, she will, sailing at the rate of twelve miles per hour, be within reach of our pieces, say twenty minutes; in those twenty minutes each gun will, upon an average, discharge twelve shots, consequently a battery of say forty guns will discharge four hundred and eighty shots and shells, which, when directed with skill, will, in most instances, have their effect against passing vessels.

In answering the third point in the Secretary's letter to the chief engineer, I would say that vessels-of-war would at all times afford important services in the defence of our seaports; and could they be so multiplied as to be found at each port in sufficient numbers to cope, with the assistance of auxiliary means obtained on the spur of the moment, with a powerful naval force, then they would in a measure remove the necessity of creating another species of defence; but this state of things cannot well take place. Our navy can never attain such pre-eminence, and consequently must, while subdivided along the coast, as it will be in time of war, be found in the minority by an invading force, and thereby be compelled to seek for protection under our fortifications. Their co-operating with the defences in our harbors, they will become extremely important and of great assistance.

Steam batteries have often been spoken of, and might, perhaps, be of service where the channel-way is narrow, and can afford them protection from the shores; but in open roadsteads I would not rely much upon them; they necessarily must be slow and unwieldly, and in consequence liable to be turned and even avoided by an active naval force. All other temporary expedients, such as arming merchant ships, steamers, &c., might, perhaps, be made useful for a short time, and upon a particular emergency, but no reliance could be placed upon them. The immense expense attending the transformation of these vessels, together with the cost of their imperfect armament, would hardly warrant the introduction of such a doubtful system of casual defence in our large seaports. The havoc which would naturally result to these light vessels, when

engaged with heavy ships-of-the-line and war steamers, would, I am inclined to believe, be extremely disastrous. The expense, moreover, for such temporary means would, I believe, exceed the cost of the permanent fortifications constructed for the same object.

Permit me for a moment to digress, by stating that there is one consideration attending our expenditures for fortifications which, in my opinion, is far from being unimportant to the general welfare of the country, aside from the importance I attach to fortifications as national defences, and which but few, perhaps, have considered; it is, that every article used for our defences is found in a crude state in our country, and generally in the neighborhood of our important works. The manipulation of these materials gives employment to a large and useful class of our citizens, and creates, as it were, a sort of revenue which benefits both the laborer and the government, first by rewarding industry, and that industry, by the natural course of things, bringing back to the aid of the general government portions of the revenue which that industry enables the laborer to obtain from abroad through our custom-houses. For instance, a quarry, when worked, requires many hands; these hands, devoting all their time to their arduous labor, find it necessary to exchange the price of that labor for the necessaries of life, hence imported goods of many kinds must find a market with them. The manufacturers of bricks, cement, lime, lumber, iron, and other materials used in the construction of our fortifications come under the same rule, and, independent of the mechanics and laborers employed in our public works, form a large and useful class of our citizens, all returning to the general fund a portion of revenue created, in fact, only by their industry.

I name this fact to show that, although many look upon our system of defence as costly, yet the advantages of it, independent of the security it affords to the country in a military point of view, are substantial and important to the community at large, inasmuch as they create a revenue by bringing out the latent resources of the country.

The fourth point relates to our northern frontier and its defences. I can but look upon that frontier as an exposed one, and consequently requiring the watchful eye and fostering care of the government. Our neighbors have been diligently employed since the war of 1814 in strengthening her borders, and many vast improvements have been made by them to keep pace with our increasing strength in population on the lakes. Their population, too, is increasing, and the Welland canal has removed obstacles which gives them now the advantage of an inland navigation from the St. Lawrence through to all the lakes. If there ever was a time when a system of defences planned and executed for the protection of our extensive northern frontier, it is the present one, when we can weigh the advantages that could be derived from the great improvements already in evidence on the opposite side of the lakes. If Great Britain should ever hereafter be found at war with us, a portion of the naval force would be found on the lakes, and interfering with our frontier towns and cities and our inland commerce. The redundancy of her population at home would naturally place at her disposal the means of increasing her forces in those inland seas and by a system of locomotive warfare disturb and annoy a population numerically much stronger than the forces she would oppose to them.

To meet this state of things it would seem indispensable to fortify permanently certain points in our northern frontier, not only for the protection of those positions, and as depots for provisions and munitions of war, but as great rallying points for the militia and other troops.

The remarks I have already made upon the subject of national defences for the seaboard, in connexion with auxiliary means, will apply to the lake defences so far as the mercantile marine is concerned; they might become of use if supported or protected by permanent fortifications, but left to themselves they could hardly be expected to cope with vessels-of-war.

In the war of 1812 and 1814 the ascendancy on the lakes between the British navy and ours fluctuated according to the number of vessels constructed and the time they took their element; one single vessel added to the one or the other would give, for the time being, the preponderance to that side; but the time is past when we ought to think of adopting the same system, since, by the vigilance of Great Britain, she has opened the way for any number of armed vessels she may be able to spare from her own coast. These circumstances would, of themselves, seem to indicate the necessity of fortifying the vulnerable as well as the important points on the lakes.

The few defences temporarily erected during that war on the northern frontier bore testimony of their great usefulness in checking the enemy's ingress. At Plattsburg, for instance, when our navy, protected under the guns of the forts, gained a brilliant victory over the enemy; Sir George Prevost, with an army of fourteen thousand men, found there an opposition which compelled him to retreat precipitately, leaving his sick and wounded at the mercy of the American general commanding. Thus a garrison of fourteen hundred men, which was the force of General Macomb, within well planned defences, protected our navy on Lake Champlain, and taking the offensive as well as the defensive, compelled an army of fourteen thousand men to abandon the project of invading the country, which was understood to be the avowed intention of the British commander.

Many other instances of the kind occurred during that war which could be mentioned to show the importance of works of defence on our inland borders.

In conclusion, permit me to say that to protect the lives of its citizens is a high consideration with every government, but with none can it be so important as with ours, when it is considered that our population is yet too thin and sparse to furnish large masses for war services. We must, in consequence, use all means at our disposal to reduce the number of troops required for active service in time of war, and these should, so far as practicable, be protected by these means; I know of none more effectual for this important object than permanent fortifications. By multiplying them you relieve a portion of your useful citizens from the perils and hardships incident to the fields of battle, and leave them at home to pursue their useful avocations.

In presenting this feeble view of the subject, could I persuade myself that any portion of it would be acceptable or useful to the honorable the Secretary of War, it would be most gratifying to me; as imperfect as it is, I submit it with all respect.

R. E. DE RUSSY,
Lieutenant Colonel Engineers.

Brigadier General Jos. G. TOTTEN,
Chief Engineer of the United States, Washington.

No. 9.

Report of Major W. H. Chase.

CHASEFIELD, NEAR PENSACOLA, *April* 17, 1851.

The undersigned, in compliance with the orders of the Secretary of War, communicated through the chief engineer, has the honor to submit to the War Department the following views and opinions of the subject embraced in the first resolution of the series adopted by the House of Representatives of the United States during its session on the 3d of March, 1851.

In viewing "the general system adopted after the war with Great Britain, and since pursued in regard to the permanent fortifications then deemed necessary for the national defence," it will be relevant to the subject to allude to the condition of that defence when the United States declared themselves independent of Great Britain, and prepared to sustain that declaration by force of arms during the period of peace from 1783 to 1812, and during the war of 1812–'15.

In the first period the defences on the seaboard of the colonies, extending from Nova Scotia to Florida, were confined to a few points. England having driven the French from their North American colonies, had little fear of any future attempt on the part of France either to regain her lost possessions or to attack the other possessions of England in America.

In the course of the war of independence the English were driven in succession from Boston, New York, Yorktown, and other places, and finally from the whole country, by which the power of the United States, even in its incipiency to resist aggression from the most powerful of nations, was favorably exhibited.

Few or no additional sea-coast defences were constructed during the war, yet the public and private armed ships, issuing from the ports of the United States, did immense injury to British commerce, and even kept the whole western coasts of England and Scotland in constant alarm. Some hastily raised redoubts on Dorchester heights, compelled the English to retreat from Boston with their fleet and army; and the castle defending the entrance to the harbor, falling into the hands of the Americans, together with some temporary erections of earth on the surrounding heights and islands, secured Boston from again being occupied by the enemy. Charleston was successfully defended by the Palmetto fort against a squadron of ships; and the success generally of the American arms up to the surrender of Yorktown, demonstrated, if not the impossibility of reducing the colonies to subjection, at least the enormous expenditure of life and money attendant on the attempt.

This truth led, with other things, to a change of policy in England in regard to the United States. The new administration made peace with the colonies; and the wise statemen of England saw that an intimate commercial intercourse with the United States as an independent power would probably be more advantageous to the interests of their country than the possession of colonies that would require much blood and treasure to regain and hold; whilst the trade with the same would be interrupted and precarious. The foundation of this policy was the preservation for the future of uninterrupted friendly relations between England and America; and it was the determination of the party in power to secure at all hazards and at all times peace with the United States.

But unfortunately for a strict adherence to these views, the great wars growing out of the French revolution placed England in position to struggle for her very existence as an independent power; and in the course of the contest principles in relation to neutrality were adopted, and so rigidly adhered to, that the interests and honor of neutral nations, and of the United States in particular, were compromised. In persisting to assert her arrogant pretensions, the government of England was deceived by its diplomatic agents and friends as to the effect produced in America. These, judging of the strength of the party in opposition to Mr. Madison's administration, and of the talent and influence of the principal men of that party, constantly represented to the English government that the President would not recommend to Congress a declaration of war against England in the face of the powerful party opposed to such a measure. A secretary of legation in Washington was the only correspondent of the English ministry who understood the exact state of things in the United States. He repeatedly advised the minister of foreign affairs that the latter was not correctly informed of the feeling in America; and that, unless the orders in council were revoked and other obnoxious measures and acts abated, war would certainly be declared against England by the United States.

At last the secretary was listened to, and the orders in council were repealed; but before the news reached the United States war had been declared. The messengers bearing respectively the declaration of war and the order removing the principal cause which led to the declaration, passed each other on the ocean.

Thus was the war of 1812–'15, or, as it has been termed, "the second war of independence," a blunder which England lost no time in remedying, by seeking for and concluding a peace with the United States as soon as she could do so with honor to herself.

At the time peace was made England was never more powerful. Triumphant over all her enemies in Europe by sea and land, she was left by the general peace of 1814 in possession of vast means, ready organized and practiced in war, with which she might have given the United States some severe though not fatal blows. But however much her pride of power might have been gratified by carrying her triumphant arms to America, she preferred at once to resume peaceful and intimate relations with the United States, and to secure all the advantages flowing therefrom, then and forever. Her far-seeing statesmen knew that the true policy to be followed in respect to the United States in 1815 was, with increased reasons for its adoption, that indicated by the statesmen of 1783; and they resolved that no future blunder should lead to a war between the United States and England so far as the latter could prevent it. In this favorable state of the political atmosphere, the clouds that lowered over the north-eastern boundary, over Canada during the patriot demonstration, and over Oregon, were soon cleared away. It is true that the United States yielded in these instances something more than was due to England's just claims; but it was rather the graceful yielding of a daughter to a mother's solicitation than the acknowledgments of any power of coercion possessed by England. If the peaceful views of England were not then generally acknowledged, they are now made manifest. England is not only at this time to a great degree dependent on the United States in commercial matters, but signs are significant that she considers her future fate depends on maintaining the most friendly relations with the United States, so that they would, from interest in commercial matters, and perhaps from a better feeling for their noble mother, *look with disfavor on any combination of the European powers to humble and crush her.*

France also gave evidence how much importance she attached to the maintenance of the most intimate relations in trade with this country, and how reluctantly, if at all, she would resort to hostilities with the United States. The King of the French, supported by public opinion, was enabled to overcome the opposition of the chambers to the payment of the amount stipulated by treaty to be paid for spoliations on our commerce. This public opinion was especially expressed by numerous petitions, coming up from the great commercial and manufacturing districts of the kingdom, praying that the difficulties with America might be settled and peace preserved.

During the period extending from 1783 to 1812, considerable expenditures were made from time to time on the forts and batteries at the principal seaports, in anticipation of possible war growing out of the French revolution, and more recently in consequence of the continued aggression on our commerce by English cruisers; so that when war actually broke out in 1812 there was not a town of any magnitude that was not supplied with one or more batteries. Nevertheless, there were a great many small towns exposed without defence to the enemy, and were left unmolested by him, seeing that their destruction or injury could in no-wise facilitate his operations, whilst such acts of vandalism would serve only to hold him up to the execration of the civilized world.

In the course of the war of 1812–'15 the defences of the country were considerably increased in value by the construction of field-works; and in no instance were such defences, supported by well-trained and patriotic volunteers, ever overcome. Attacks were made on Fort Boyer at Mobile, on Fort McHenry

at Baltimore, and on Fort St. Philip below New Orleans, and were successfully repelled. Our vessels-of-war were blockaded in New London, and chased into Marblehead and Boston, where they found security under the batteries. Castine was taken and held by the enemy, but being a point of no importance it was not retaken, for it served to detach a portion of the enemy's forces from operating at other points.

Washington was reached, and the Capitol brutally attacked and defaced. The success of the enemy, in this instance, was obtained less from the well-arranged plan of his operations than from the imbecility of the generals commanding the American forces rallied for the defence. The enemy was signally defeated many times, by sea and land, and the war was triumphantly terminated by the battle of New Orleans.

Thus was the country preserved intact, during a war of two years and eight months, against the operations of an enemy having the mastery at sea, and when the defences of the country were comparatively weak.

It should be here remarked that a large expenditure of money was incurred in consequence of the want of facile lines of rail, canal, or common way communications leading toward and along the northern, Atlantic, and Gulf frontiers, through which men, munitions, and machinery of war could be transported. Yet in face of these difficulties, movements were generally made when required, efficiently and with considerable promptness.

It was on account of the difficulty of wielding mobile forces for the defence of the seaboard and lake frontiers, rather than from any signal success obtained by the enemy against the ports and batteries, that it was determined at the close of the war to adopt a system of defence by permanent fortifications on a large scale. Under an excitement fed by the friends of the scheme, Congress voted large sums of money to be expended on works which were to be planned, principally, by a foreign engineer, with such help as might, perchance, be rendered by the native officers of engineers, some of whom had not altogether escaped distinction in the late war. A distinguished general officer of engineers in France, who stood high in the estimation of Napoleon, was engaged and received in service of the United States under the title of assistant engineer, with the rank and pay of a brigadier general. No protest against this arrangement was made by those officers of engineers whose rank and influence would have entitled them to be heard in opposition, if any was entertained by them. The acquiescence of these officers, if not amounting to approval, led Congress and the authorities to suppose that no serious disapproval of the measures adopted was entertained by them. Being thus negatively indorsed, it was considered that a good arrangement had been made by the government, by which a lack of skill in the native officers, unfitting them for the task of designing the grand scheme of defence, might be supplied by an importation from abroad.

Under the auspices of the foreign engineer, a scheme for the defence of the seaboard from Passamaquoddy to the Sabine was devised, involving a cost of many millions of dollars, and submitted to and approved by the government.

The progress of construction of the works under the new, or as it has been termed "the third system of defence," was not very rapid. The Gulf frontier being considered the weakest and most assailable was first attended to, and in about ten years the river and lake approaches to New Orleans, and the entrance to Mobile bay, were occupied by strong works. The commencement of new works of the system was, in the meantime, gradually extended to the north and south Atlantic coasts, and subsequently to all of the most important points along the Gulf and Atlantic frontiers. These defences, combining the repairs of old works with the construction of new ones, place the sea-coast of the United States in a better condition of defence than that of any other sea-coast in the world.

In planning the new works, it seems to have been taken for granted, in many instances, that each work must depend on itself, without chance of succor from

forces operating on the rear and flanks. Works were thus constructed, to sustain a siege from ten to fifty days, in the midst of a population from which relief to the invested work could be drawn in twenty-four hours. The expensive arrangement of these land defences have greatly increased the cost of the works, already from their nature very costly; and at this day excite the surprise of the professional examiner, acquainted with the vast means of collateral defence possessed by the United States, that anything more should have been required for most of the works, than security against assault by escalade.

The report to be made by the chief engineer of the United States, on the *second* resolution of the series before mentioned, will exhibit the exact condition of the works composing "the third system of defence," the number and strength of the works; the first estimates of cost; their extent, capacity, armament, and actual cost; and an estimate of the sums necessary to complete them.

This exhibition will prove what has been herein stated, *that the United States, at this time, possess the best fortified sea-coast in the world.*

Whilst the defence of the coast has been gradually accomplished in the course of thirty-five years by the construction of permanent, extensive, and expensive fortifications, new and important elements in the national defence and security have been rapidly, almost magically, developed. Our population has increased from 8,000,000 to 23,000,000. The progress of improvement in agriculture, manufactures and commerce, and in the facile lines of intercommunication necessary to meet the demands of the growing prosperity of the country, has advanced in a ratio even greater than that of the population.

The lines of communication, in combination with the electric telegraph, whilst they impart new life and vigor to the country, bring distant sections of it in easy correspondence with the centre, at once affording security against foreign aggression, and making the people more interested in preserving those glorious institutions under which, for seventy years, they have happily lived and prospered.

The interior and exterior commerce of the country have advanced with surprising strides. the latter has become so necessary to the leading commercial nations of the world, that its interruption would produce disastrous results to those nations. The stoppage of the supply of cotton following a war with the United States, would be attended in England by the most serious consequences to her trade and finances—consequences deemed by many as being fatal to the political institutions of that country.

In this brief review we have passed through three epochs: that of the revolutionary war; that of the war of 1812–'15; and that of the elapsed time from 1815 to 1851.

In the first epoch it has been shown that the power of England, although relatively greater than it is now in respect to this country, aided also as it was by a considerable portion of the inhabitants remaining loyal to England, was inadequate to subdue our people, or to retain any portion of our soil.

In the second epoch it has also been shown that though the national defence by permanent fortifications was weak in comparison with the present one, and the means for the operation of the mobile forces were limited and difficult in their use, the most formidable demonstrations of the enemy were easily defeated and the country preserved from any injurious attacks of the enemy, except in one or two instances.

And in the third epoch it is shown that, in the several international difficulties which have arisen with France and England, those powerful nations gave evidence throughout the pending negotiations, of their desire to maintain that pacific policy so essential to the prosecution of the commercial and manufacturing pursuits which have been extended so rapidly in their respective countries during the last thirty years.

This epoch, now of thirty-five years duration, is distinguished for the profound

peace which has been maintained throughout the civilized world without interruption, except in the instances of the Mexican war, and of some unimportant conflicts in Europe; and that whilst it has thus been distinguished, it is no less so on account of the wonderful progress made in the arts and sciences, by whose influence the character of nations and of their governments have been greatly changed for the better, affording new guarantees that the pacific policy, so long and profitably maintained by the leading commercial nations, will continue to be cherished toward all countries and toward ours in particular.

In view, then, of all these things, and especially of the new elements, moral, political, and physical, claimed to have been developed and to have greatly increased the power of the United States, *and which must be considered in relation to the future arrangement of the national defence*, the undersigned thinks that the general plan adopted thirty-five years ago should be essentially modified, by reducing the number and size of the works proposed to be constructed, and by abandoning some of the defences now in progress of construction, or which are about to be constructed under existing appropriations made by Congress.

The undersigned is also of the opinion that the best interests of the country require that the subject of modification should be submitted to a board composed of artillery and engineer officers, and some eminent civilians. That no new work should be commenced, even if it has been appropriated for by Congress; and that no appropriation should be made by Congress for the completion and repairs of existing works, until the whole subject of the national defence has been considered and reported by the said board.

The Secretary of War desires "that the chief engineer and the above-named officers (Colonel Thayer, Lieutenant Colonel De Russy, Major Delafield, and Major Chase) should direct their inquiries particularly to the following points:

"1st. How far the invention and extension of railways have superseded or diminished the necessity of fortifications on the seaboard?

"2d. In what manner and to what extent the navigation of the ocean by steam, and particularly the application of steam to vessels-of-war, and recent improvements in artillery and other military inventions and discoveries, affect the question?

"3d. How far vessels-of-war, steam batteries, ordinary merchant ships and steamers, and other temporary expedients can be relied upon as substitutes for permanent fortifications for the defence of the large seaports?

"4th. How far the increase of the population on the northern frontier, and of the mercantile marine on the northern lakes, can obviate or diminish the necessity of continuing the system of fortifications on those lakes?"

The results of the inquiries made by the undersigned in the premises, are expressed as follows:

1st. The invention and extension of railways and of the electric telegraph, in connexion with the great increase in the number and size of steam vessels navigating the rivers, bays, lakes, and ocean, have added greatly to the strength of the Union, by bringing the most distant sections within a few days' travel of the centre, and do thus contribute to preserve tranquillity at home and repel aggression from abroad.

The lines of railways, assuming the radiating point at New York, will shortly be extended to most of the important seaboard and inland towns in the United States. The telegraph lines following the rails, and also diverging from them, are beginning to interlace the country in every direction. By these means, and the rapid increase of our population indigenously and by immigration, agriculture and manufactures, have been surprisingly extended throughout our broad domain, and an internal commerce has arisen, by the interchange of the products of art and of our various climates, which is considered to be of greater value than the exterior commerce of the country. With the exception of a few articles,

our artificial and natural productions embrace everything that can be produced in any part of the world.

These are immense elements of strength to a nation, and insure its power and prosperity. This is the moral effect.

The existence of these railways and telegraphs contribute directly and physically to the defence of the country, by enabling men and military supplies to be collected promptly and moved rapidly to points threatened with invasion. Railways extend already along the coast, in some instances, in double lines, from Portland to Savannah, connecting all the intermediate cities and other important points with the canals and rivers and the naval and military arsenals and depots. From this great base line, other lines convergent and divergent, have reached lakes Erie, Ontario, and Champlain, and they are rapidly approaching and crossing the great lakes and rivers of the west. And it is hoped that Congress will not long delay, in conjunction with the State of Texas, in making such a donation of lands as will enable private enterprise to commence and complete a railway leading from some point between the mouth of Red river and New Orleans, through Louisiana and Texas to El Paso, and thence through the valley of the Gila to San Diego, in California.

A single example of the pervading extent of the railway system will at once illustrate the subject, and exhibit in a favorable light these new means for the national defence. The completion of the railway now in course of completion, from Wilmington, in North Carolina, to Manchester, in South Carolina, will enable troops to be transported continuously, by railway, from the valley of the Tennessee to Norfolk in *two days*, to Washington in *two and a half days*, and to Charleston and Savannah in *one day*. The extension of the railway now being made from Chattanooga, on the Tennessee river, to Nashville, will enable the volunteers from the superb military population of Tennessee to be carried to the most distant points of the north and south Atlantic, almost at a moment's warning, and in the course of three or four days; whilst the speedy completion of the road from Atlanta, in Georgia, to Montgomery, in Alabama, and the probable construction of a road from Montgomery to Mobile and Pensacola, will bring the Gulf of Mexico within a day's travel of the same great State of Tennessee.

At the north the system of railways is much more extended. The New York and Erie road, now complete, is proposed to be extended along the shore of Lake Erie to Cleveland, and thence to Detroit, from whence a road has been carried to Chicago, on Lake Michigan. The seaboard base of railways will thus be brought within easy communication of the most distant lake frontier.

The Massachusetts, Vermont, St. Lawrence, and Montreal railways will bring the whole Canada frontier, extending from Lake Ontario down to Montreal, within twenty-four hours' travel, on an average, of Boston, Portland, and New York.

The transportation of troops on railways may be effected with great promptness. The first regiment of Pennsylvania, raised in Philadelphia, the most distant point from the scene of action, were transported so rapidly to New Orleans, *via* Pittsburg and the Pennsylvania railways, that the regiment, one thousand strong, was placed in the van of the volunteer forces, raised for the campaign against Mexico, under General Scott.

Sufficient has been said to show that railways and the electric telegraph contribute largely to the national defence; that the works covering our large seaports and other important points, placed in connexion with the railways and telegraph, if they were now to be constructed, might be much reduced in size and cost, if not in number; that the facility with which these works could be relieved, in case of an attempted siege, would have rendered it only necessary for them to be made secure against a *coup-de-main*.

Under these views of the subject, it is at once perceived that, whilst the ex-

tension and invention of railways and the electric telegraph do not supersede, they greatly diminish the necessity of adding to the number and cost of the fortifications on the seaboard; or, in other words, that the future prosecution of the system of defence by permanent fortifications should be on a very reduced scale in comparison with the magnificent one adopted thirty-five years ago.

2d. The navigation of the ocean by steam, and the application of steam to vessels-of-war, have certainly added to the facilities of naval operations in making attacks and transporting troops. But such operations are necessarily confined to short lines, like those between France and England, in the Mediterranean, or on the lakes between Canada and the United States.

Attacks by steamers can only be formidable when they are numerous and filled with troops destined for a grand attack; but when they are thus filled with troops, munitions of war, provisions, armament, and their regular crews, little room is left for the fuel necessary to propel them to the scene of action and in retreat. Such steamers cannot be propelled either conveniently or rapidly until the propelling power can be produced at a less outlay for fuel. At the rate supposed to be the maximum of speed of war-steamers, lines of operations over one thousand miles (five hundred in advance and five hundred in retreat) cannot be occupied advantageously, or with the efficiency necessary to a great movement of a strategic or direct attack. Numerous transports would be necessary to convey supplies of coal to convenient places on the coast, where depots for the same would have to be established and defended at great cost, for they would be constantly in danger of attack by sea and land from enterprising assailants. Besides, the great loads of men, munitions, armaments, provisions, and fuel that war and transport steamers would be obliged to carry, multiply the dangers of navigation.

Certainly steamers could make sudden and brief attempts to enter harbors and destroy towns, but fast-sailing ships with favorable winds could do the same, if this kind of marauding and piratical warfare was carried on by any Christian nation calling itself civilized, and if not opposed by the same machines of war as those used by the enemy and by acts of retaliation.

Such attempts might be successful in attack and retreat, if made in the night, even if the harbor was strongly fortified, if the fortifications were unaided by rafts and hulks lying across the channels.

But a demonstration on a large scale against the important ports and arsenals, for the purpose of taking possession and levying contributions, requires considerable land forces, even against such points as were not defended by batteries, for at such points, in time of war, earth erections would be made and easily supplied with cannon of heavy calibre, that would do great damage, by direct and vertical cannonade, to the enemy's vessels and forces afloat after they had entered the harbor, and probably compel them to leave it, and force him to select a more distant point for the initiative of attack.

If the enemy, strong in ships and soldiers, could be driven from Boston by the erection of some redoubts in the course of one night, it is hardly to be supposed that he would attempt to recapture the position, or to attack any other position similarly situated.

Any such demonstration at the present day would be checked by the means just enumerated, and be met on its flanks and in front by the mobile forces rallied by the telegraph to the point of attack.

The improvement in artillery, as regards size and efficiency, has been of late years very great, but it inures more to the benefit of the defence than the attack. In the same way that, if steam applied to ships-of-war afford any advantage to the attack, steam applied on railways, combined with the electric telegraph, affords greater advantages to the defence, by reason of the greater facility with which forces may be moved by the latter means.

From all which it may be safely asserted that the navigation of the ocean by

steam, the application of steam to vessels-of-war, and recent improvement in artillery and other military inventions, do not exhibit the attack of forts on the seaboard superior to the defence, where those forts are connected with railways and are brought within succor of the surrounding population, nor do they render additions to the present fortifications in number, size, or cost in anywise necessary. But, on the contrary, the improvement in artillery, if those fortifications had now to be built, would enable their plans to be reduced *one-half* in size and the armament *one-fourth* in amount.

The substitution of the 10-inch columbiad for the mixed and most inefficient armaments with which our fortifications have been garnished at great expense, is already forced upon us by the introduction of those superb guns on board of vessels-of-war. It would be ridiculous, if it be intended to adhere in any degree to the present system of sea-coast defence, to retain the present armaments, composed principally as they are of 12, 18, 24, 32, and 42-pounders. It is the opinion of many persons, entertained for years past, that but one class of guns should be generally used in our batteries on the coast, and that these guns should be of the largest calibre which experiment has demonstrated could be efficiently used.

Fort McKee, in the harbor of Pensacola, is supplied with one hundred and twenty guns, composed of about equal numbers of 24, 32, and 42-pounders. The average effective range of these guns may be stated at 1,100 yards, and the weight of metal that may be projected from the entire battery at 3,920 pounds. Now *thirty* 10-inch columbiads would throw the same weight of solid shot and strike an object with precision at 2,200 yards distant; so that whilst the number of guns at Fort McKee might be reduced seventy-five in one hundred, the effective range by solid and hollow shot would be increased one hundred in one hundred, and the efficiency of the batteries greatly increased, at the same time the size of that work might be reduced at least one-half.

3d. Our large seaports and naval depots being already covered by extensive works, and requiring but small additional defences, the discussion of the question as to the superiority of those defences over vessels-of-war, floating batteries, ordinary merchant vessels and steamers, and other temporary expedients, would seem to be unnecessary All experience, however, has shown that any kind of floating defences is inferior, on every score, to land batteries where the localities will permit the latter to be used. This subject has been ably discussed and illustrated in the report made by a board of officers to the Secretary of War in 1840, on the national defences. Other temporary expedients, such as rafts, hulks sunk in channels, and ridges of stone thrown across the same, could be relied upon, in most instances, only as auxiliary defence to land batteries.

4th. In considering how far the increase of population on the northern frontier, and of the mercantile marine on the northern lakes, obviates the necessity of continuing the system of fortifications on those lakes, it will be necessary to bring into view some of the elements of strength, moral, physical, and political possessed by the United States, and which have already been alluded to in this report.

The chief moral and political element is the aversion to war with the United States felt by Great Britain, whose present superiority in naval means of attack makes her, of all nations, alone formidable to us. This aversion arises from the intimate and *entangling* relations in commerce with this country, and from the dependence of England upon the United States for the chief supply of cotton to the leading branch of her manufactures. And this aversion to the slightest approach of international hostility is not abated by the consideration that the untoward event of war with the United States would prompt Russia and France to carry out their long-cherished designs of aggrandizement in Turkey, Syria, and India.

The principal physical elements are: first, the facility with which, by means

of existing railways, we could approach Montreal with a large force, and drive thence the British forces to seek shelter under the walls of Quebec, and finally from all Canada; by which simple and rapid movement the two provinces would fall without a struggle into our possession, with one-half of its population, at least, inclined to a change of sovereignty; and second, the superiority of our mercantile marine, affording convertible means for a naval force, giving us the mastery of the lakes, and enabling us to crush any partizan attempts coming from the Canada shore; and third, the superiority of our advantages on the score of a military population lying along the whole northern and lake frontier.

These great moral, physical, and political advantages being undeniable, the continuation of the system of fortifications on the northern and lake frontier would involve a useless waste of public money.

The large sums of money expended and proposed to be expended on the defensive works extending from Rouse's Point to the Sault of St. Marie would have been, and will be more beneficially applied to the improvement of the lake harbors and dependent rivers, thus promoting the interests of commerce in time of peace, and affording depots for our naval forces in time of war.

By demonstrating that such an application of the public money would directly promote the national defence, not only on the lakes, in substitution of fortifications, but on the seaboard, in aiding the defence by fortifications, much of the opposition entertained, on constitutional grounds, towards internal improvements, would be removed.

Under these views, it is the opinion of the undersigned that the whole system of fortifications for the defence of the northern and lake frontiers should at once be abandoned, and that no more money be applied even for the repairs or completion of the existing works.

The undersigned, in conclusion, would express his opinion in repetition, that a board of artillery and engineer officers and civilians should be formed to take into consideration the whole subject of the national defences, as called for by the resolutions of the House of Representatives, passed in the session of March 3, 1851, and as particularly and searchingly alluded to by the Secretary of War, in his order of April 17, 1851, with a view to the changes necessary to be made in "the third system of defence," commenced thirty-five years ago; and of the adaptation of the same, *inversely*, to the increased power, political, physical, and moral, of the United States.

The composition of such a board being well calculated to have the whole subject opened fairly and discussed freely, by which errors of opinions, particularly those arising from professional prejudices and interests, would be exposed and corrected, the truth in the premises made manifest, and the good of the commonwealth secured.

Civilians versed in national and international policy, and officers known to be opposed to the system of defence on its present scale, as well as those who have declared in its favor, would cause the *pour* and *contre* to be fairly stated, and all sophistry and false principles to be detected and discarded.

In the event of such a board being formed, it is suggested that the *ayes* and *noes* on all important questions should be ordered to be taken and recorded.

Respectfully submitted,

WM. H. CHASE,
Major of Engineers.

Hon. C. M. CONRAD,
Secretary of War.

No. 10.

Report of Major R. Delafield.

Views and opinions of Major Richard Delafield, of the corps of engineers, on the following points connected with the defence of the coasts of the United States, called for by the Secretary of War in his communication of the 17th of April, 1851:

1st. How far the invention and extension of railroads have superseded or diminished the necessity of fortifications on the seaboard?

No member of the corps of engineers, so far as I am acquainted, has ever considered it expedient to construct *permanent* fortifications along our *seaboard*, to defend it against armies operating on the land. The art of fortification, in such an emergency, is principally confined to temporary field-works, thrown up after the enemy has effected a landing, and selected his route of approach.

Such fortifications are only needed to oppose infantry and field artillery, requiring little less than earth for their construction, and executed by the troops in the field, and with a few days' labor.

To the more speedy accomplishment of this particular, in the defence of the nation, railroads have contributed greatly.

Fortifications of a *permanent character*, requiring a long time to construct and perfect, are, however, considered indispensably necessary to prevent the ingress of the powerful floating batteries that can sail or steam into our harbors, against which railroads can oppose, neither directly nor indirectly, an efficient resistance.

The city of New York, for example, is within three hours' sail of the ocean. Ships-of-war of the heaviest class, and war steamers with troops, can come to the docks of this city, or lay at anchor in the East and North rivers, and do as much injury and destruction as may suit an enemy's purpose. Now, although several railroads centre in this city from distant and most populous sections of our country, they can bring nothing to prevent the entrance of a maritime force. No number of men that can be concentrated in New York, or along the shores of the water approaches, however well disciplined they may be, can oppose, with any probability of success, the passage of a hostile fleet from the sea to the city, or prevent its destroying its mercantile marine and real estate. Field artillery, infantry, cavalry, and riflemen can have no effect upon ships-of-the-line; and the increase of numbers would but swell the loss of our citizens by uselessly exposing them to a ship's broadsides.

The many thousands of uniformed militia that could, within forty-eight hours, be concentrated by railroad and river steamers in New York and its vicinity, could do positively nothing in arresting a hostile fleet from destroying the city.

It will be asked, then, are railroads of no value or use in the defence of the sea-coast? Most certainly, they are a valuable auxiliary; economizing time and treasure, and preventing many a predatory expedition that an enemy might otherwise undertake.

Landings for supplies of provisions, water, or for any hostile purpose against all the cities and towns of the Union, are rendered much more difficult and hazardous to an enemy. Ere he can effect a landing, march to the city, and destroy or lay it under contribution, the railroads and river steamers could transport from hundreds of miles the uniform militia of the country in far greater numbers than any fleet can be expected to bring across the ocean; *provided*, we can cause such landings to be made at such a distance from the cities as to give time for the railroads and steamers to transport the militia after they are assembled. In all such landings an enemy can have no other description of force than *we* can bring to oppose him. He has, in such case, been compelled to leave his heavy battering ships.

But so long as he could reach the cities in his ships, he never could throw the advantage in our favor by landing, unless the distance to march was within a few hours' march of his landing.

There is, then, no other permanently reliable, economical, and efficient means of preventing the approach and entrance into our harbors of these ships' batteries, whether sailing or steam, than by opposing them with similar and superior batteries, and compelling the ships to fight the batteries by temporary obstructions in the channels—locating these batteries at the greatest distance that can be found to protect the channels. Such batteries are but *fortifications*. In their construction we must arrange them for the heaviest class of guns, to secure their action at the greatest distance, and to produce the greatest injury to ships-of-the-line or steamers.

That the troops manning these batteries may not be exposed to the ships' fire, they must be covered in front by earth or masonry, and either placed so high that from a ship's deck, thirty feet above water, they cannot be looked into, or else must be covered over head to secure the gunners. Where the site is not naturally high enough for this purpose, we gain it by masonry, which introduces the construction known as a casemated battery. Once forced to this mode of construction, economy prompts us to put tiers of guns over each other.

But these batteries, however well calculated to protect the men at their guns, must be enclosed in the rear; otherwise, the marines of a fleet could land, pass into them and drive the artillerists from their guns.

This makes an enclosed battery or fortification, and upon these alone can we depend to protect our harbors, cities, dock yards, &c., economically and efficiently.

These enclosed works must be of such a nature that there shall be no one point outside that cannot be seen from some point within, of such a height that they cannot be scaled by an active and disciplined force, and so strong that field artillery cannot destroy them, which gives time for the militia of the country to march to their relief, and force back any troops that may have landed to take them.

The great change brought about by railroads and river steamers in our system of defence is in lessening the artificial strength of the land defences of the sea-coast fortifications. Just after the war of 1812 to 1815, it was considered necessary to give them such strength as to require as many days for their reduction as would suffice for assembling the militia in mass and marching to the relief of the forts.

The time of taking a well-constructed fort, properly defended, is a matter of calculation, when its strength is such as to compel the forms of a siege. The basis of this calculation is the excavation and removal of a given quantity of earth, and the landing, mounting, and serving a given number of heavy guns. The guns are to be mounted on the edges of the ditches of the forts, and this can only be done by what is termed zigzag approaches, constituting a siege. At the period above referred to, there were few positions in the United States that did not allow time for an enemy to land, and take, in the above manner, an ordinary bastioned front, ere the militia of the country could come to its relief in sufficient numbers to contend with disciplined forces.

But at the present time we have but to fulfil the condition of strength on the land side to resist a coup de main or escalade, thereby forcing an enemy to bring up a battering train for its reduction, and we gain the time necessary for its relief. We now need no second line of defence—a simple flanked scarp, covered with earth, suffices. Herein is the great difference brought about by railroads, that of reducing the magnitude and expense of the land defences of the sea-coast batteries. But the power of the batteries themselves, it will be seen hereafter, must be stronger than ever.

2d. In what manner and to what extent the navigation of the ocean by steam, and particularly the application of steam to vessels-of-war, and recent improve-

ments in artillery and other military inventions and discoveries affect this question?

The navigation of the ocean by steam has had a great influence upon the defence of our seaboard. "The heavy armament of war steamers, their ample storage and accommodation for troops, the rapidity of their evolutions and facility of transport, altogether constitute them convenient and formidable instruments for *offensive warfare*, particularly for making a descent upon any line of coast with a powerful army. Since 1815 it has enabled seamen to set the elements at defiance, and this would lead hostile powers to consider us more open to invasion."

Before its introduction, it required an immense marine and long time for preparation ere an enemy could effect an invasion of our shores. The expedition fitted out by England against New Orleans was known by us to be in preparation, for some part of our coast, six months before its arrival. After sailing, it had to rendezvous at Jamaica, (from whence, also, we heard of its concentration,) and again at Ship island, before commencing to disembark. This gave much time for us to prepare. At that date we may be considered as having had six months' notice of an intended expedition.

At the present time, with the aid of steam, the notice comes with the blow; a few days now suffices to invade either Boston, New York, Philadelphia, Baltimore, Norfolk, Charleston, or Savannah, from Bermuda. It is the introduction of steam navigation that has given such an advantage over us, compared with the sailing vessels of 1815.

In 1812 Great Britain considered Halifax a suitable place for her naval depot, and stores for her fleet on our coast. It so continued until a recent date, when they discovered that our proximity by land enabled us to reach and destroy it, beyond their power to prevent it. The consequence has been, that a central point opposite our Atlantic seaboard (Bermuda) has been selected, fortified, and still being fortified with great care and strength, and fitted as a naval depot. To it, already, have all the naval stores been removed from Halifax. It is secure against the power or force we can most readily command, (an army,) and, by fortifications, is secure against any naval armament we are likely to possess.

From this point an army can embark in steamers, and in three days be anchored in our harbors, without any other notice than their coming in sight of our headland, but not long enough to enable us to draw together militia to oppose them. Hence it is that we are comparatively weaker, at this time, by the introduction of steam navigation.

Another important facility to an enemy, and to our disadvantage, is gained by the steamship. Fifteen such vessels as have lately been built will carry an army of ten thousand men, with their munitions, to any point on our Atlantic coast in a *given space* of time, and without any necessity for other rendezvous than the point of attack. Whereas, some hundred sailing transports would be required for the same army, and no calculation made of their arriving at their destination within days of each other.

The defences of the coast of France and England, on the channel, forcibly illustrate the change effected by ocean steam navigation. England considered herself safe from invasion, by the strength of her *channel fleet*. France considered herself equally safe, by the fortifications of her harbors. For a long period neither power could injure each other, guarded as they were. The fleets of England made many demonstrations upon the coasts of France, but never effected anything of importance, and Napoleon made a powerful combined demonstration with his army and fleet, and failed by the superiority of the English fleet.

But since steam has risen to its present importance, these two nations are considered as having materially changed their relations of defence.

France, with her preponderating land force, transported by steamers, can

readily invade England. The channel fleet of old would no longer be a protection. The statesmen of England, fully aware of this state of things, have for some time past been endeavoring to restore their ascendency.

A channel fleet combined with the aid of fortification, "which experience in war and science can suggest," (Duke of Wellington to the chief engineers,) is now their reliance, but it is a fleet of steam ships-of-war. Several of their ships-of-the-line have been fitted with screw propelling engines, as an auxiliary power, retaining the sails and their *powerful broadsides*. The first ship *built* in the English dock yards of this class is the Sanspareil of eighty-one guns 2,235 tons; carrying on her lower deck thirty 32-pounders of fifty-six hundredweight, nine feet six inches long; main deck, thirty eight-inch guns of fifty-two hundredweight, eight feet long; quarter deck and forecastle, twenty 32-pounders of twenty-five hundredweight, six feet long, one ten-inch gun of eighty-four hundredweight, nine feet four inches long, with a three hundred and fifty horse-power engine, launched at Davenport in April, 1851. With vessels of this description they hope to retain their ascendency on the water, and protect their ports, in the absence of the fleet, against sudden attacks of an enemy's steamers, by fortifications.

In relation to the application of steam to ships-of-war, up to the building of the above vessel, the problem had not been solved. Not a single steamship had been built calculated to contend with a land battery, or a broadside of a ship-of-the-line. We have not, to this day, an instance of steamers having exposed themselves successfully or for any determined purpose to hostile guns, with the exception of the little English iron steamer Nemesis in the Chinese war, where she accomplished much, but against batteries of no value.

As transports and tow-boats, they have contributed greatly to the success of fleets on the invasion of Algiers by the French under Beaumont; the fleet was towed into position abreast the Algerine batteries by their war steamers. At Vera Cruz they made the same use of their steamers—at Beyrout, on the coast of Syria, although the English had the best of their war steamers, they were only used as tow-boats—taking distant stations in the latter part of the action and shelling the fortification.

The French army that recently operated against Rome was transported from Toulon by steamers, carrying artillery, cavalry, and infantry.

The result, then, of the navigation of the ocean by steam goes to prove a greater necessity than ever for defending our cities, harbors and dock yards by some efficient means, whether by fortifications, steam vessels-of-war, or other means, is yet to be considered.

The next branch of inquiry under this second head is: "In what manner and to what extent has the recent improvements in artillery and other military inventions and discoveries affected this question?"

The recent improvements in artillery, I apprehend, are rather the result of calling old things by new names, and thus bringing them afresh into notice, than any substantial advantage.

The use of what is generally called the Paixhan gun is supposed to have produced a great revolution in the sea-coast defence. It is no more nor less than firing hollow shot horizontally, a practice that has prevailed as long as the howitzer has been known (about 1693.) The only difference between the field and siege howitzer and Colonel Paixhan's gun is, that he makes his gun longer, and, by his writings, has caused them to be introduced *again* on board ships-of-war, and probably more used for sea-coast batteries.

In our own service we had made use of such long howitzers for sea-coast defence years before Colonel Paixhan gave anything to the public on the subject. We called them columbiads, many of which are now to be seen on Governor's island, in this harbor, that were in use from 1812 to 1815.

On the ocean the use of hollow shot fired horizontally was made by the Count

De Grasse, off the Chesapeake, during our revolutionary war, and abandoned in consequence of the serious injury caused by the accidental explosion of the shells about the decks.

Since their re-introduction similar results have occurred. The steamer Medea, one of Admiral Stopford's fleet, operating against the Egyptians in 1840, when off Alexandria, was seriously injured by the bursting of a shell that, with five others, had been got on deck for examination; one beam was split asunder, the whole deck raised, and every buckhead in the captain's cabin, ward, and gun-rooms torn to shreds, and the vessel set on fire.

About the same period (December, 1840,) a similar accident occurred on board the Excellent, the gunnery ship at Portsmouth, on trying some shells *after hearing* of the accident on board of the Medea. The fuses, in both cases, were metal with screw caps, supposed to be a secure preventive against accidents on board vessels. The use, therefore, of this improvement in artillery, for steamers, and on board ships-of-war is, I conceive, quite problematical, while, on the other hand, its value in the sea-coast batteries is increased by the greater ranges, precision of fire, and facility of causing the explosion about the intended and critical moment.

While such shells fired from ships against stone walls and earthen parapets are harmless, breaking to pieces in the one case, and throwing up a few yards of earth only in the other, the injury to the steamer or ship is far greater than from any other artillery in use.

It may not be amiss, under this head, to show the effect of this species of artillery upon vessels, proving, as I think, very conclusively, the safe reliance we may have in defending our harbors by them if mounted in favorable positions.

The effect of hot shot and shells from these columbiads (I must be permitted to use the American name as of prior invention) against shipping was shown by Captain Hastings, in the service of the Greeks, who, at Salona, in 1826–'7, fired not only hot shells, which he substituted for hot shot, as by their weight they broke through both sides of small vessels, but he fired carcasses and shells from 68-pounder guns. During the affair at Salona, he says, by the time he had fired twice, a brig-of-war blew up, owing to a shell exploding in her magazine. An armed transport brig sank forward owing to a shell exploding in her bow, and was set on fire aft by a hot shell. At Trickere he burnt a brig-of-war with hot shot. During an attack of the Greeks against a monastery at Pinæus, within the straits between Salonis and Megara, and for the relief of Athens, the Turkish pacha opened a battery of five guns upon the Greek steamer Perseverance, two of them long five-inch howitzers, producing considerable effect. One shot struck the carriage of a long 68-pounder and exploded there, another exploded in the counter of the Perseverance and tore out two streaks for a length of six feet, and started out the planking from two adjacent streaks, when the steamer retreated from this dangerous position.

In the attack on the harbor of Tolo, the Greeks directed the fire of 68-pounders' shells on a brig—a shell struck her, exploding in her hull and blew her foremast into the water. They afterwards made an attack upon a Turkish squadron of nine vessels, and opened a fire upon the Turkish admiral's ship, distant about five hundred yards, with hot shells. The second fire of two hot shells from the long guns and two carcasses from carronades, one lodged in the hull of the Turkish commodore, and, reaching the magazine, blew her up. A carcase shell exploded in the bows of a brig next to the commodore; she sank forward, while a hot shell striking her stern, which stood up in shallow water, soon enveloped her in flames. In a few minutes another vessel was on fire, and an Algerine vessel having received a shell, which exploded between decks, was abandoned by her crew.

In the harbor of Patras, the Greeks made an attack upon an Austrian brig loaded for the Turkish army, by opening upon her a fire of shells from 68-

pounders; one of them exploded in her hull near the water's edge, tore out a great part of her side, when she sank almost immediately.

All these results are calculated to show the effect of hollow shot fired horizontally from what is generally called Paixhan guns against shipping, and proves the efficacy of sea-coast defences armed with such artillery.

Of the effect of such a fire against forts, from ships or steamers, I recall to mind that of the French fleet under Joumanville, against the castle of St. Juan d'Ulloa, when a shell entering an embrasure, passed into a magazine through an unprotected door, and blew it up.

In 1840, the steam frigates Phœnix, Stranbole, Gorgon, and Vesuvius, were of the fleet that made an attack upon St. Jean d'Acre. They shelled *the town* with long guns, from positions beyond gun-range of the batteries, during the attack by the ships-of-the-line, keeping beyond the range of the shore batteries.

During the Carlist war, in Spain, several English steamers presented themselves against the land batteries, but retired on receiving the first fire from the land.

Other than the several instances herein referred to I can recall to mind now, and they all go to show that the use of columbiads is a most reliable means of protecting our harbors against ships or steamers.

Another improvement having a bearing on this subject is that of submarine artillery. Fulton's efforts with torpedoes were of little avail during his lifetime. The attempts upon the English ship Plantagenet, in Lynnhaven bay, and upon Admiral Warren's fleet, off New London, during the war of 1812 to 1815, which proved abortive, are the only instances I am aware of with these machines. Since his death, however, a new agent—that of electro-galvanism—has come into use, enabling us to explode a shell or magazine of powder under water at any particular instant of time. This power may be made auxiliary in the defence of our coast, in the channels over which hostile vessels must pass in approaching our cities; but it can only be of use in connexion with forts, from which the electro-agent is worked, and from whence to protect the torpedoes until the proper moment of using them, as well as from whence to ascertain the exact instant of time in firing them. An undefended position will not admit of their successful application. It is an uncertain auxiliary in the defence of our ship channels, yet one that would be resorted to by officers acquainted with its advantages. Gutta-percha elastic tubes, within which the wires may be protected, is another modern invention, facilitating the use of the electro-galvanic mode of instantaneous explosion.

The effect of the railroad is to economize greatly the military resources of the nation, by relying upon a much smaller disciplined force to act against hostile landings. For example, the same troops that would operate against a hostile army moving on Boston, would suffice to act against the same force that should afterwards attempt to march upon New York, Philadelphia, or Baltimore, or Washington. Before their transports could pass from one to the other, the railroad could transport the army to oppose them.

It is a knowledge of an enemy's movements only that is necessary to enable us to take advantage of the railroad speed of transportation; and here the more recent discovery of the electro-telegraph comes into valuable use. But there is nothing in these inventions or improvements that lessens the importance and necessity of opposing the powerful floating armaments that can be brought against us by equally powerful batteries; for let me again repeat, that a myriad of men, with rifles and other small arms, is nothing against a ship's broadside.

One other change in modern artillery deserves to be noticed: During the last half century the calibre of the guns mounted on board ships-of-war has greatly increased, and made it necessary to increase the power of the batteries that may be constructed to oppose them. Objections have sometimes been taken to the power of our sea-coast batteries; a little reflection will, I doubt not, show the

necessity of their being made equal, in all respects, to the batteries by which they can be assailed.

From 1776 to 1783 frigates of thirty-two, twenty-eight, and twenty-four guns mounted twelve-pounders on their main deck.

In 1800 most of the English frigates mounted twelve and eighteen-pounders. In February of that year the admiralty ordered all ships of twenty-four and twenty guns to be fitted on the main deck for thirty-two pounder carronades, in lieu of the long NINE-POUNDERS hitherto carried.

The Danish forty-gun ship Freya mounted eighteen-pounders. The Danish vessels at Copenhagen, attacked by Nelson, mounted—

Forty-eight thirty-six-pounders.
Three hundred and sixty twenty-four-pounders.
Seventy eighteen-pounders.
Ninety-eight twelve-pounders.
Fifty-two eight-pounders.

Nelson's fleet mounted—

One hundred and forty thirty-two-pounders.
Seventy-four twenty-four-pounders.
One hundred and ninety-two eighteen-pounders.
Twenty-two twelve-pounders.
One hundred and fourteen nine-pounders.
Six six-pounders; together with carronades.

1805. The Victory, Nelson's flagship at Trafalgar, mounted on her first deck, long thirty-two-pounders; second deck, long twenty-four-pounders; third deck, long twelve-pounders; quarter deck and forecastle, twelve-pounders, and two sixty-eight-pounders, carronades. The French admiral's ship, in the same action, mounted thirty-two and eighteen-pounders; thirty of the eighteen-pounders on her upper deck. The Tarinant, of ninety guns, mounted eighteen-pounders on her main deck. The Belle Isle has twenty-four-pounders on her main deck. The San Ildefonsa had fifty-eight long twenty-four-pounders on the first and second decks; four long eight-pounders and ten thirty-six-pounders, carronades, on the quarter deck and forecastle.

1808. The Caledonia, English ship of one hundred and twenty-two guns, launched this year, mounted on first deck, thirty-two-pounders; second deck, twenty-four-pounders; third deck, eighteen-pounders; quarter deck, twelve-pounders and thirty-two-pounders, carronades, and the same calibre on the forecastle; on the roundhouse she carried eighteen-pounders.

1811. France had no frigate, and England only four that carried long twenty-four-pounders, at this date.

1820. At this date France ordered *thirty and thirty-two*-pounders for *all their* ships-of-war.

1839. Finally, the English, on the 20th of February of this year, ordered all her ships-of-war to be armed with thirty-two and sixty-eight-pounders.

1851. By referring to another part of this memoir, it will be seen that an eighty-one-gun ship-of-the-line is now mounted with the tremendous battery of thirty-two-pounders and eight-inch guns.

This regular increase demands, on our part, a like armament, and that we relax nothing in the artillery for the defence of the coast, requiring more time to build, and stronger works to receive and resist such artillery.

3d. How far vessels-of-war, steam batteries, ordinary merchant ships, and steamers, and other temporary expedients, can be relied upon as a substitute for permanent fortifications for the defence of our large seaports?

It follows, from what has been said under the two previous heads, that a nation may rely upon a navy as a substitute for fortifications, in a great measure, for the defence of not only her large seaports, but for her coasts generally.

The two cases of France and England exemplifying that either a fleet or fortifications have heretofore sufficed.

The great question that arises, in adapting the one or the other exclusively, will be the cost, the efficiency at the eventful moment, and the consequences, in a political point of view, of directing such immense resources as dependence upon a fleet would require to a system that has its advantage in throwing the evils of war from our shores at the same time that its success brings a spirit of conquest and aggrandizement, limited only by the extent to which the nation may be led by the glory its arms shall achieve.

My opinion is, that sound policy calls upon us to adopt the mixed system of permanent batteries in conjunction with ships-of-the-line and war steamers.

If we adopt a floating system, we must make ourselves superior afloat to our enemy. Every seaport and dock yard must be provided with its own floating batteries, available for its waters and adjacent shoals. The great estuaries leading into the heart of the country must each be watched and protected. The floating defences that will protect Boston cannot secure the Hudson, Delaware, Chesapeake, southern coast, Gulf of Mexico, and Pacific, at one and the same time. Nor can we place reliance upon our superior fleet blockading our enemy in his ports. The fallacy of this reliance is exemplified by the sailing of the Yavlan fleet and transports no less than three times without being perceived, and being afloat in the narrow sea of the Mediterranean fifty-two days, notwithstanding all the watchfulness of the English fleet; a single detachment of the enemy's fleet escaping the blockade, sails for any of our harbors, where it must be met either by floating or land batteries. Hence, we have no alternative but a decided superiority, if we place reliance upon floating batteries.

These floating defences are of the most perishable character, and enormously expensive in first cost and repairs, compared with land batteries. To have some idea of the cost of fleets, let us look to the history of Europe.

The French estimate that a ship will last but twelve years; and to have forty ships-of-the-line and fifty frigates in commission, it is necessary to have fifty-three ships-of-the-line and sixty frigates, so great and constant are the necessary repairs. The fact was stated to the French Chamber by C. Dupin, as deduced from their own experience.

The cost of maintaining the French fleet annually, from 1689 to 1789, was averaged	$7,808,000
From 1776 to 1783 was averaged	19,400,000
" 1783 to 1786 it was	12,600,000
For the year 1797..do	16,700,000
" 1805..do	28,000,000
" 1808..do	22,000,000
" 1814..do	10,200,000
" 1816..do	9,600,000
" 1818..do	8,640,000
In 1837 the Chambers voted	10,800,000
In 1847.....do	18,053,908

The cost of maintaining the navy of the United States for forty-one years, from 1792 to 1832, inclusive, was $112,097,122, giving an annual average of	$2,734,076
From 1812 to 1815, inclusive, it amounted to	26,376,215
The annual average being (four years)	6,594,053
From 1831 to 1837,	31,393,151
The annual average being (six years)	5,232,191

The cost of maintaining the navy of Great Britain, from 1799 to 1851, (not including 1841 to 1844,) a period of forty-one years, amounts to the sum of $2,283,645,277

The annual average being (forty-nine years)	$46,604,284
From 1799 to 1815, fifteen years of war	1,356,248,803
The annual average being	79,779,341
From 1816 to 1851, not including 1841 to 1844	927,395,437
The annual average being (thirty-two years)	28,981,106

These enormous sums enable us to form some judgment of the gradual increase in the annual expenses of maintaining a navy, and the expenses in periods of peace, compared with war. Now let us examine into the magnitude of the fleets of Europe, at different points, to form some idea of the number of ships we must have to secure that superiority that will justify our reliance upon floating defences.

The French fleet, by no means the strongest we are likely to contend with, consists of the following number of large ships at the period stated:

In 1789.....81 ships-of-the-line, and 69 frigates.
March, 1791.....73.....do.....67...do.
Dec., 1791.....86.....do.....78...do.
" 1792.....82.....do.....68...do.
Feb., 1793.....75.....do.....59...do.
" 1801.....39.....do.....35...do.
June, 1814.....73.....do.....41...do.
" 1817.....68.....do.....38...do.
" 1827.....59.....do.....51...do.
" 1828.....59.....do.....51...do.
July, 1829.....33.....do.....41...do. only.

At this date she was building eighty ships to restore her navy and replace the rotten and decayed ships.

In 1837 she had one hundred and fifty-three ships afloat, and in 1847 she had two hundred and sixteen ships afloat, sixty-six of which were steamers.

The study of the above shows the losses that the vanquished have to sustain from time to time—an item to be more particularly stated hereafter.

The following table gives a more enlarged view of the strength of the different naval powers:

Fleets of the different nations in 1783, 1793, 1829, *and* 1840.

	England.	France.	Spain.	Holland.	Sweden.	Russia.	Turkey.	Portugal.	United States.
1783.									
Ships-of-the-line	105	80	50	32	.....	.....	.....	.....	.....
Ships of fifty guns	13	7	3	.....	.....	.....	.....	.....	.....
Frigates	132	103	48	28	.....	.....	.....	.....	.....
Ships-of-war	217	86	31	13	.....	.....	.....	.....	.....
Smaller vessels	88	34	25	6	.....	.....	.....	.....	.....
	455	319	160	79	.....	.....	.....	.....	.....
1793.									
Ships-of-the-line	153	86	76	49	30	60	39	.....	.....
Frigates	149	78	56	38	11	57	21	.....	.....
Smaller vessels	109	82	72	32	60	3	140	.....	.....
	411	246	204	119	101	120	200	.....	.....
1829.									
Ships-of-the-line	131	33	6	12	.....	32	.....	2	.....
Frigates	149	41	12	80	.....	25	.....	6	.....
Smaller vessels	336	148	94	63	.....	24	.....	15	.....
	615	222	102	105	.....	81	.....	23	.....
1840									
Ships-of-the-line	120	49	3	11	11	50	15	.....	11
Frigates	141	62	4	21	8	25	15	.....	30
Smaller vessels	317	242	9	32	14	40	18	.....	16
	578	353	16	54	33	115	48	.....	57

Having now some data upon which to judge of the number of ships we must have as a substitute for permanent fortifications for the defence of our coast, let us now examine the losses that must be sustained by a reliance upon floating defences, as conqueror and conquered.

Loss of the English fleet during the war from 1793 to 1801. Captured, destroyed, wrecked, foundered, and burnt:

Ships-of-the-line	20
Under the line	145
Total	165

Loss of the French, Dutch, Spanish and Danish ships during the same war. Captured, destroyed, wrecked, foundered, and burnt:

Ships-of-the-line	84
Under the line, of which 150 were frigates	234
Total	318

Loss of the English fleet during the war from May, 1803, to July, 1815. Captured, destroyed, wrecked, foundered, and burnt:

Ships-of-the-line	13
Under the line	304
Total	317

Loss of the enemy's fleet during the same wars, namely, French, Dutch, Spanish, Danish, Russian, Turkish, and American. Same causes as above:

Ships-of-the-line	71
Under the line	108
Total	179

In our statements of the cost of maintaining fleets, the total expenditure has been given, including wages of seamen, ordnance, &c. To make some comparison between the cost of building fortifications and building ships, the following facts may be useful:

The wear and tear of ships of the English fleet, 1799 to 1819, inclusive, was	$322,849,296
The cost of building and repairing ships during the same period, was	70,789,070
Total cost of wear and tear and building in 21 years	393,638,366
Or, an average per annum of	18,744,784
The cost of building the ships afloat, comprising the navy of the United States in 1842, was	$9,052,725
The cost of repairs upon the same vessels from time to time, was	5,579,229
Total	14,631,984

Here we have the repairs to first cost in the ratio of five and a half to nine. This cost was for fifty vessels, or for five ships-of-the-line, eleven frigates, including two steamers, and thirty-four smaller vessels, mounting in all 1,440 guns. The average cost per gun, repairs included, is $10,161. The average cost per gun, omitting repairs, is $6,286.

But cost of an exclusive reliance upon floating defences is far greater than appears by this statement. To it should be added the cost and repairs put upon the Constellation, Java, Guerriere, two steamers Fulton, and all the other vessels lost, broken up, foundered, &c., of which I can find no account, and which of themselves (the cost) would go far towards building lasting and permanent defences for some of the harbors on our coast.

I would wish to present the cost of the several fortifications on our coast and the repairs from time to time, but have no data therefor. The only fortifications with which I can make the comparison is Fort Schuyler, the cost of which

to this date is	$843, 187
To this add for completion, (it is now ready to receive its entire armament, and is as defensible as can be made; the work remaining to be done consists in conveniences for the garrison,) say	50, 000
Making the sum of	893, 187

This work is to be armed with one hundred and eighty-four guns, producing an average of $4,855 per gun. This single fort, calculated to endure for ages, is considered an equivalent in defence to an enemy's fleet, and a substitute for a fleet of floating batteries, otherwise necessary.

If we look to permanent land batteries for the defence of our harbors, we have at all times a suitable disciplined force in the *uniform* militia of our cities and towns for their garrisons, ready at short notice to man the guns. On the contrary, for floating defences we must look to the more limited number of sailors, unaccustomed to guns, and to be disciplined for the purpose.

There is no room for doubt, in my mind, that we cannot, with due regard to the safety of our cities, towns, and dock yards, rely upon vessels-of-war and steam batteries, and that economy demands a dependence to be placed in heavy land batteries built in the most permanent manner. The reliance upon ordinary merchant ships and steamers, as well as any other temporary expedient, I consider as no dependence whatever. Let us imagine a small fleet only of such STEAMSHIPS OF THE LINE as that elsewhere described, mounting thirty-two pounders and eight and ten-inch columbiads, and what chance is there against such broadsides for anything that can be made of merchant ships and mercantile steamers? Such vessels are in no manner suited for heavy armaments, and would, in a measure, have to be rebuilt to fit them for defence. Against a single ship-of-the-line, becalmed or anchored in smooth water, we might hope to interpose a formidable resistance with temporary batteries on merchant ships' decks, towed by mercantile steamers; but against several, mutually acting either on the offensive or defensive, and with auxiliary steam power, (or even without,) capable of flanking each other's position, no defence whatever could be placed in them.

There is no part of our coast where beneficial results might be better calculated upon from temporary expedients of this character than Louisiana. *The ports being built* to keep off the enemy's heavy batteries, he must take to his boats. These, when transporting troops, could readily be run down and destroyed by merchant steamers. A hostile army that might have gained the dry land of the Mississippi would be exceedingly annoyed by floating batteries on the decks of ships towed by steamers; but as a defensive, no reliance could be placed upon them. The facility with which field-guns and howitzers could set fire to and destroy such floating expedients is exemplified by the destruction of vessels used by us in the defence of Louisiana in 1814–'15. Where such expedients are unexpected, and no suitable force at hand to contend with them, they are of great value; but let our enemy know that such is our only defence, and he readily commands the means of destroying them.

4th. How far the increase of population on the northern frontier, and of the mercantile and marine on the northern lakes, obviates or diminishes the necessity of continuing the system of fortifications on these lakes?

Upon this point I am not so well prepared to present my views fully, having seen but little of the country and possessing few statistical facts upon which to rely.

On the lakes, as on the ocean, we have no need of fortresses to arrest the movements of invading armies. It is against the operations of floating batteries, as in the former case, that we build forts in this section of our country. Had our neighbors no vessels or means of procuring them we would have no need of forts; but we know they possess both a naval and a mercantile marine of steam and sailing vessels, and have fortified positions superior in strength to our own, within which to protect their mercantile marine, and, when occasion offers, to equip them either as transports or armed vessels.

In the event of a war, a desperate effort would be made to seize upon everything afloat in our ports. The same effort we would doubtless make to secure the floating power of our neighbors. We know, however, that Kingston has for years past been fortified, and strong works, I believe, are still in progress

for the land and water defences of that harbor. So long as they hold it, we cannot gain the important point of capturing the only means in their possession to annoy us. An invasion into the heart of our country is not likely to be thought of; and if undertaken, must result in the destruction of the invading force by the vast increase and present density of our population.

It would not be possible for an invading army to leave the lake shores beyond a few days' march. With the command of the lakes, our shores and all the towns and important lines of canals and railroads would be at the mercy of an enemy to lay under contribution, or burn and destroy, as might be their policy. Without heavy batteries to combat their fleet, we can offer no successful opposition by our superiority of numbers to such predatory naval expeditions.

With a naval superiority we could blockade their ports and have the means of pursuing any vessels that might escape the blockade. To protect ourselves in this way our force must be decidedly superior; and our resources would enable us to do so if we can in the commencemeet of a war save even our mercantile marine and capture that of our enemy. Without fortified harbors I cannot see how we can gain such results and advantages with an enemy possessing safe harbors, offering effectual security to his vessels.

Nor could we at once calculate upon reducing Kingston. The fortifications at that place cannot be taken by assault or destroyed by bombardment. It is only by the operations of a systematic siege that they can be arrested from the hands of an enemy. Some time must elapse after the breaking out of the war before we could hope to take so important a place.

The command of the wider parts of the St. Lawrence is in the hands of the power possessing the naval superiority. We could not cross that river, where its banks are beyond gunshot from our shores without such naval ascendency, thereby prolonging the time necessary for reducing Kingston.

The commercial ports, in which self-interest now draws our numerous merchant steamers and ships, should therefore be provided with such heavy land batteries as will effectually secure the shipping in the commencement of hostilities and during any temporary check to our operations on land and water.

The same protection should be given to inlets, by which vessels could cut the lines of our railroads and canal communications.

Such batteries or fortifications are our only certain security. No increase of population or of mercantile marine can give us that protection (with the means our neighbors have at command) in the commencement of hostilities; nor can we gain the ascendency on the lakes without some fortified harbor, under cover of which to build and equip a fleet. The subjugation of the Canadas, if the result of a war, will not be accomplished before Quebec and Kingston are reduced.

These two places, if defended in proportion to their artificial strength, will call for harder fighting and more prolonged than any battle we have yet fought. They certainly can be taken, and we believe we know enough of their construction to fit out the necessary armaments, but it will require time, and large military resources, during which the lake coast should not be left unguarded and unprotected.

The reduction of these two fortresses cuts off in the one case all further relief from the northern country, and all means of further annoyance by water in the other; but the entire subjugation and annexation of the country to ours depends more upon the people. Unless they see fit to govern themselves, as a part of our confederacy, we cannot make them. We may hold it by military power, but with the people opposed, the struggle will not cease with the fall of Quebec and Kingston.

All of which is respectfully submitted.

RICHARD DELAFIELD,
Major of Engineers.

Letter from Charles Stewart, United States navy.

BORDENTOWN, NEW JERSEY,
November 11, 1851.

SIR: I received from the Hon. Secretary of the Navy a copy of your letter to him, dated June 22, together with a copy of the resolutions of the House of Representatives at their last session, in relation to the fortifications adopted in the year 1816 by the United States government, and after the war with Great Britain, requesting answers to the questions propounded in the letter from some of the naval officers. Having no knowledge of the plan proposed at the period referred to, I am only enabled to predicate my opinion on the presumption that what was then adopted, and that under the experience of the war which had then terminated, was the best that could be devised to afford protection to those places and interests they were designed to secure.

The first question demands to know, "To what extent, if any, ought the present system of fortifications for the protection of our seaboard to be modified, in consequence of the application of steam to vessels-of-war," &c., &c.

In answer to this question, I beg leave to say that no good reason presents itself to my mind for the abandoning of any of the works now in progress of construction, or for the reduction of the number contemplated to be erected, in consequence of the application of steam to the purposes of maritime warfare, or in consequence of the improvement in projectiles. But, on the contrary, I should presume, that as the application of steam is now assuming a determined and fixed means in the prosecution of national hostilities, that instead of an abandonment of any portion of the defences that have been adopted, a more extensive means of resistance and protection at all such points as present objects worthy of being attacked on our maritime frontier would be called for and induced, that the honor of the government may be sustained and the deep interest of the people secured. It may be true, yet I do not think it probable, that some of the places contemplated to be fortified in the plan of 1816 may have so deteriorated in interest as to admit of modifications or changes in the plan of fortifying; of this, however, I have no means of forming an opinion; but if we take into consideration the great advantage and facilities which steam power will accord to naval armaments for approach, attacking, or for passing insufficient fortifications, it cannot but appear to the government that this constitutes a new and highly dangerous power to be guarded against in all future time; more especially on a maritime frontier of very great extent, and deeply indented with water communication, affording to an enemy who possess steam power the greatest facilities of annoyance in all directions of our country.

Your second question asks, "What reliance could be placed on vessels of war or of commerce, floating batteries, gunboats, &c., &c., as substitutes for permanent fortifications?"

In answer to this question, I must say that I am of opinion that but little reliance ought to be placed for the security of high national interest on defences of such doubtful character. They are too subject to untoward casualties to constitute at all times a reliable means of resistance; and besides, they would require permanent fortifications to afford them continuance and protection. As auxiliaries to permanent works in resisting attacks, they might be made available sometimes with good effect, but no further ought they to be relied on.

To the third question which you ask, "Is it necessary or expedient to continue the system of fortifications on the shores of the northern lakes?"

I again beg to express my entire ignorance of what that system proposes should be done. But considering that those lake shores constitute an important frontier boundary between our interior country and a powerful military and naval nation, I should think that it would be politic to secure by fortifications

as far as reasonably practicable, all the important positions essential to commercial purposes and naval preparations for the lakes. In this direction there is but one power with whom we may be brought into collision, and that is Great Britain. She is, however, a power who, on a probability of hostilities with the United States, would readily throw on to our border and on the lakes a powerful re-enforcement of military and naval annoyance to our lake frontier.

Very respectfully, I have the honor to remain your obedient servant,

CHARLES STEWART.

Hon. C. M. CONRAD,
Secretary of War, Washington, D. C.